EXHIBIT

206

Event Study Methodology and The Computation of Damages for Secondary Market Misrepresentations: Striving for a Technicolor Palette

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Abstract

The use of event study methodology ('ESM') for computing damages for secondary market misrepresentations is poorly understood by lawyers, judges, and policy makers in Canada. This paper reviews the economic foundations of ESM and discusses the various pitfalls that may arise. Foremost among these is thin trading in the securities of the subject firm. Thin trading gives rise to a host of problems including difficulties in beta estimation, the need to use long event windows tailored to the particular issuer in question, the enhanced likelihood of confounding events occurring in the event window, and an increased noise to signal ratio and commensurate reduction in the 'statistical power of the test' yielding a higher probability of a type II error and making it more difficult to establish statistical significance. Because of these difficulties, and because there is a trade-off between type I and type II errors, I suggest that it may be appropriate to set the level of statistical significance at 0.10 rather than the usual 0.05 for thinly traded stocks. Whether the market is efficient or inefficient, however, care must be taken to determine if insider trading or rational market anticipation has moved the stock price prior to a corrective announcement, and the event window adjusted appropriately. While there is a dearth of empirical studies, I present impressionistic evidence that many Canadian public companies do not trade in an informationally efficient market, such that many of the above-noted complications arise in the use of ESM. Finally, I examine the scheme for computing secondary market damages under the Ontario *Securities Act* ('OSA'), which mandates the use of mechanical rules that are almost certain to materially mis-estimate damages in both efficient and inefficient markets.

JEL Classifications: G14, G18, K22

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A. Introduction

On December 31, 2005, amendments to the Ontario *Securities Act*[1] ['OSA'] came into force enshrining, for the first time, a comprehensive regime of liabilities governing secondary market misrepresentations and failures to make timely disclosure[2] ['FTMTDs'].[3] The Ontario template has now been adopted in almost all of the other Canadian provinces.[4]

This article addresses a single - and rather central - issue arising in connection with secondary market liabilities; the computation of damages. One principal aim is to construct a set of heuristics to assist lawyers, expert witnesses, and judges with respect to the calculation of damages. These heuristics are based on the standard method used by financial economists for assessing the price movement of an individual issuer's securities in response to new information – event study methodology.

The first part of the paper seeks to acquaint the reader with both the theoretical and empirical bases of event study methodology. It also seeks to develop an understanding of the various complications that can (and frequently do) arise in the field application of event study methodology. These complications may require (*inter alia*) an adjustment to the event window over which a change in price is measured, or the exclusion of confounding events from the measured price change.

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[1] *Securities Act*, RSO 1990, c S.5.

[2] There are four basic secondary market liabilities. These are; a misrepresentation of good news, a misrepresentation of bad news, a FTMTD of good news and a FTMTD of bad news. These are all digested in table 1. Table 1 also indicates some possible motivations that would inspire each type of disclosure (or non-disclosure), which traders suffer a loss (and the source of their loss), which traders do not suffer a loss, and pertinent sections in the OSA defining the eligible classes of plaintiffs.

[3] The legislation followed very closely recommendations made by a blue-ribbon panel established by the Toronto Stock Exchange; Toronto Stock Exchange Committee on Corporate Disclosure (Thomas I A Allen, Chair) *Responsible Corporate Disclosure: A Search For Balance* (Toronto: Toronto Stock Exchange, 1997).

[4] *Securities Act* (British Columbia) RSBC 1996 c 418, Part 16.1; *Securities Act* (Alberta) RSA 2000 c S-4, Part 17.01; *Securities Act* (Ontario) RSO 1990 c S.5, Part XXIII.1; *Securities Act* (Quebec) CQLR, c V-1.1, Chapter 2 Division II; *The Securities Act* (Manitoba) RSM 1988 c S-50 Part XVIII; *Securities Act* (New Brunswick) SNB 2004 c S-5.5, Part 11.1; *Securities Act* (Newfoundland and Labrador) RSNL 1990 c S-13 Part XXII.1; *Securities Act* (Prince Edward Island) RSPEI 1988 c S-3.1 Part 14; *The Securities Act* (Saskatchewan) 1988 SS 1988-89 c. S-42.2 Part XXVIII.1.

A major theme throughout is that the measurement of damages must be sensitive to whether or not the securities of the issuer in question trade in an efficient or inefficient manner. In an efficient market, a short event window (often one[5] or two days) is typically appropriate. By contrast, in an inefficient market, it is necessary to employ a longer event window – and the choice of precisely *how long* is not subject to any mechanical rules. In addition, in an inefficient market, the likelihood that measured damages will be contaminated by exogenous market movements or confounding events is much greater.

Another principal aim of this article is to critique the method for calculating damages found in the OSA and its many provincial offspring. The burden of the argument is that the Ontario template is likely, in the vast majority of cases, to lead to a materially incorrect calculation of damages.

B. Efficient Market Theory, Event Study Methodology, and the Measurement of Damages

1. Efficient Market Theory

A market is informationally efficient is respect of a given set of information if that information is fully reflected in the public trading price. Following Fama's lead,[6] economists generally consider three different types of efficiency based on three distinct sets of information:[7]

- Weak-form efficiency, based on the set of information to be gleaned from past price movements
- Semi-strong form efficiency, based on all publicly available information concerning the issuer (including past price movements)
- Strong-form efficiency, which includes weak-form and semi-strong form information, plus all non-public information, such as privileged information held by insiders (e.g. directors and officers)

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[5] A one-day window is an intraday window. This may use open and close prices for the day, or data measured in minutes before and after the event.

[6] Eugene Fama, 'The Behavior of Stock Market Prices' (1965) 38 J Bus 34; Eugene Fama, 'Efficient Capital Markets: A Review of Theory and Empirical Work' (1970) 25 J Fin 383. See also Eugene F Fama, 'Efficient Capital Markets: II' (1991) 46 J Fin 1575.

[7] See e.g. Robert A. Schwartz, with Michael G. Carew and Tatiana Maksimenko, *A Market Structure Approach to Economic Analysis* (Hoboken, NJ: Wiley & Sons Inc., 2010) at 323 *et seq.*; Michael C Jensen, 'Some Anomalous Evidence Regarding Market Efficiency' (1978) 6 J Fin Econ 95, at 96.

The much-touted (though not infrequently critiqued) 'efficient market hypothesis' is a hypothesis that markets are efficient in the semi-strong form.[8] To be informationally efficient in this form, *all* publicly available information must be reflected, at any given time, in the price at which an issuer's securities trade.[9] In a market that meets this requirement, the adjustment of price to new information is virtually instantaneous. If this were not the case, then there would be arbitrage opportunities for traders to generate abnormal returns on the basis of information that is already in the public domain.[10] Indeed, one of the ways to test if a market is semi-strong form efficient is to examine the speed of adjustment of security prices to new information.

2. Event Study Methodology

a. Overview

Over a period of several decades, financial economists have developed sophisticated tools for isolating the price reaction of an issuer's securities to a particular event (whether internal or external). These tools are embodied in the so-called event study methodology ('ESM')[11]. ESM is designed to exclude exogenous market movements from the measured price change, and also potentially (if properly applied) confounding events that are unconnected with the price effect of the informationally event under study.

ESM starts with a determination of the raw unadjusted price change of an issuer's shares contemporaneous to a particular event such as the public release of new information. This price change is necessarily measured over some interval of time

[8] Jensen, ibid at 97.
[9] Jensen, ibid at 97.
[10] See e.g. Ronald C Lease and Wilbur G Lewellen, 'Market Efficiency across Securities Exchanges' (1982) 34 J Econ & Bus 101, at 101.
[11] Event study methodology dates from Eugene F Fama, Lawrence Fisher, Michael Jensen & Richard Roll, 'The Adjustment of Stock Prices to New Information' (1969) 10 International Economic Review 10. As noted by Binder, ESM has 'become the standard method of measuring security price reaction to some announcement or event.' John J Binder, 'The Event Study Methodology Since 1969' (1998) 11 Rev Quan Fin & Acct 111 [Binder, 'Event Study'], at 111. See also Sanjai Bhagat & Roberta Romano, 'Event Studies and the Law: Part I: Technique and Corporate Litigation' (2002) 4:1 Amer Law & Econ Rev 141 [Bhagat & Romano]; Craig Mackinlay, 'Event Studies in Economics and Finance' (1997) 35 J Econ Lit 13 [Mackinlay, 'Event Studies']; Mark L Mitchell and Jeffry M Netter, 'The Role of Financial Economics in Securities Fraud Cases: Applications at the Securities and Exchange Commission' (1994) 49 Bus Law 545; Daniel R Fischel, 'Use of Modern Finance Theory in Securities Fraud Cases Involving Actively Traded Securities' (1982) 38 Bus Law 1.

which is denominated the 'event window'. The event window must be tailored to the degree of efficiency with which the issuer's securities trade. If the market is highly efficient, such that the price of the issuer's securities responds essentially instantaneously, then the event window may need to be no longer than the day on which the new information arrives, or perhaps that day and the following day.[12]

If the issuer's securities do *not* trade in an informationally efficient manner, its share price will not react instantaneously to new information. Rather, the change may take a period of days. The precise length of the event window depends on the degree of inefficiency with which the issuer's securities trade.

As discussed in detail below, some of the change in price in response to the new information may occur *before* the public announcement.[13] Empirically, this has been shown to be the case where there is pre-announcement insider trading. It may also occur if the market rationally anticipates the content of the announcement. Where either of these factors is at play, the event window must be extended *backwards* to include the period during which the pre-announcement price change is found to occur.[14]

Further complications may arise due to a host of other factors, such as confounding corporate events or a disjunction between the misrepresentation (or FTMTD) and the corrective announcement. These are discussed in detail in Part E below.

b. The Normal or Benchmark Return

What underlies the ESM is the assumption that, over the event window, there can be a variety of factors – and not just the arrival of new information – that may cause an issuer's security prices to change. In order to determine the effect of a specific informational event on security price, the extraneous effect of these additional factors must be controlled for.

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[12] If the information is released after the close of markets (as is often the case), then the event window will include both the day of the announcement and the following day, typically signified as a (0,+1) event window, where 0 denotes the day of the announcement and +1 the day following the announcement. McWilliams and Siegel provide strong evidence that where there is an efficient market, many academic event studies employ excessively long event windows; Abagail McWilliams & Donald Siegel, 'Event Studies in Management Research: Theoretical and Empirical Issues' (1997) 40 The Acad of Man J 626 [McWilliams and Siegel] at 631-633.

[13] See Parts E.3 and E.4.

[14] As a matter of practice, it is customary to define more than one event window and to test each for statistical significance.

In practice, this is done by employing a model of asset returns in order to supply a 'normal' or 'benchmark' return.[15] This benchmark return serves as a baseline for computing the price change due to the arrival of new information.

There are a variety of competing models that may be used to supply the benchmark return.[16] The first and most famous is the Sharpe-Lintner[17] Capital Asset Pricing Model ['CAPM'], which posits that the expected return of a security is equal to the risk-free rate of return plus a premium based on the volatility of the security relative to the market. The CAPM, however, has been subjected to extensive empirical analysis which suggests that the intercept of the security market line is not in fact equal to the risk-free rate, nor is the risk premium as large as that predicted by the theory.[18]

A competitor model that is particularly robust for short event windows (such as those used in securities litigation) is the so-called "market model", which is the most widely used benchmark for ESM.[19] Unlike the CAPM, the market model does not operate under the constraint that the intercept of the security market line equals the risk free rate. Like the CAPM, however, the market model is based on the assumption that all issuers' share prices are affected in a stable and predictable manner by general market movements. Just as a rising tide floats all boats, a rising

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[15] It is generally assumed that a randomized set of observations will yield a normal distribution. This assumption is likely to hold in most cases. Mackinlay, 'Event Studies,' supra note 11 at 17.

[16] As noted by Binder, 'Event Study,' supra note 11 at 17,

> Abnormal returns have been measured as 1) mean-adjusted returns, 2) market-adjusted returns, 3) deviations (prediction errors) from the market model, 4) deviations from the one factor Sharpe (1964)–Lintner (1965) Capital Asset Pricing Model (CAPM) or the Black (1972) CAPM or 5) deviations from a multifactor model, such as the Arbitrage Pricing Theory (APT)...

[17] William F Sharpe, "Capital asset prices: A theory of market equilibrium under conditions of risk" (1964) 19:3 J Fin 425; John Lintner, "The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets" (1965) Rev of Econ & Stat 13.

[18] For a discussion of these and other criticisms, see Kenneth R French and Eugene F Fama, 'The Capital Asset Pricing Model: Theory and Evidence' (2004) 18 J Econ Per 25; JA Couts, TC Mills and J Roberts, 'The market model and the event study method: a synthesis of the econometric criticisms' (1994) 3 Int Rev of Fin Anal 149; Patrick O'Sullivan, 'The Capital Asset Pricing Model and the Efficient Markets Hypothesis: The Compelling Fairy Tale of Contemporary Financial Economics' (2019) 47:(3)-(4) Int J of Pol Econ 225.

[19] Mackinlay, 'Event Studies,' supra note 11; John Y Campbell, Andrew W Lo & A Craig Mackinlay, *The Econometrics of Financial Markets* (Princeton NY: Princeton University Press, 1997); Bhagat and Romano, supra note 11; Stephen J Brown & Jerold B Warner, "Measuring Security Price Performance" (1980) J Fin Econ 205 ['Measuring']. As noted by Bhagat and Romano, the market model is a statistical model that is 'not grounded in a specific economic theory' while the CAPM is derived from a 'specific economic [theory] of asset price formation'; Bhagat and Romano at 146. With respect to robustness in short event windows, see e.g. Eugene F Fama, "Market efficiency, long-term returns, and behavioral finance" (1998) 49 J Fin Econ 283.

market tends to drive the price of virtually all issuers upwards. Conversely, a falling market tends to drive the price of virtually all issuers downwards.

Not all issuer's shares are affected in precisely the same way, however. The share prices of firms engaged in the manufacture or development of advanced technologies, electronics, or luxury goods, for example, often exhibit a high degree of volatility relative to the market, as demand for their products is dependent on discretionary consumer expenditures that are greatly influenced by the general economic environment.[20] Other firms, such as food retailers, sellers of consumer staples, and utilities, tend to have low volatility relative to the market,[21] as their sales and profit margins are relatively invariant over the economic cycle.

The degree to which an issuer's share price is affected by general market movements is captured by the firm's 'beta' coefficient, which measures its price volatility relative to the market. An issuer with a beta of 1 is expected to move lockstep with the market. Thus, a 10% increase in the market is expected to produce a 10% increase in the issuer's price, and a 10% drop in the market is expected to produce a 10% decrease in the issuer's share price. By contrast, an issuer with a beta of 0.5 is expected to rise by only 5% when the market as a whole rises by 10%, and fall by 5% when the market falls by 10%. The beta coefficient is typically computed from observing the relationship between the issuer's share price and market movements in the 100-200 days prior to the event under study.[22]

The following example illustrates the manner in which the normal or benchmark return is utilized in measuring the price change due to new information. Suppose that the raw price change over the event window is 10%, but that over the same period of time, the market as a whole rises by 5%. If the issuer's beta is 0.5, then the benchmark return (i.e. the price rise attributable to the market movement alone)

[20] See e.g. Wayne Duggan, '8 S&P 500 Stocks With The Highest Betas' (December 2 2019) Benzinga, online: <https://www.benzinga.com/general/education/19/12/14913109/8-s-p-500-stocks-with-the-highest-betas>; Bob Ciura, 'The 100 Highest Beta Stocks In The S&P 500' (January 22 2020) Sure Dividend, online: <https://www.suredividend.com/high-beta-stocks/#high-vs-low>; ABG Analytics, 'List of U.S. Stock Betas for Large-Cap Stocks' (February 14 2020), online: <http://www.abg-analytics.com/stock-betas.shtml>. Formally, the products and services marketed by high beta firms have a high income elasticity of demand.

[21] ABG Analytics, 'List of U.S. Stock Betas for Large-Cap Stocks' (February 14 2020), online: <http://www.abg-analytics.com/stock-betas.shtml>. The products and services marketed by such firms are characterized by a low income elasticity of demand.

[22] Mackinlay, 'Event Studies,' supra note 11 at 15 (120 days); Bhagat & Romano, 'Event Studies,' supra note 11 (100-200 days).

is 0.5 x 5%, or 2.5%. Subtracting that from the raw price change leaves a residue of 7.5%, which is the price change attributable to the announcement in question.[23]

The difference between the normal return and the observed return on any given day in the event window is referred to as the 'abnormal return'. In order to determine the total effect of new information on price, the abnormal returns for each day of the event window are added together to determine the 'cumulative abnormal return' (or 'CAR').[24]

The degree of efficiency with which a given's issuer's securities trade is a vital datum in the fixing of damages using the ESM. In a semi-strong form efficient market, share price changes in response to new information are virtually instantaneous. Where this is the case, a) it is relatively straightforward to determine a suitable event window; b) the event window will be short (typically no more than 1 or 2 days); c) the shortness of the event window minimizes the impact of exogenous market movements on price, making the calculation of abnormal return more reliable; d) the shortness of the event window reduces the likelihood that confounding corporate events will cloud the computation of abnormal return; and e) the shortness of the event window increases statistical power (i.e. the ability to determine both the magnitude and statistical significance of any change in price). These factors are all discussed below.

If the issuer's securities do not trade in an informationally efficient market, none of factors a) to e) just enumerated hold. But even in this context, ESM is still the most useful tool that we have for computing price changes in response to new information.

Are Canadian markets efficient in the semi-strong form? The vast majority of studies conducted on market efficiency using U.S. data[25] find that financial

[23] This assumes statistical significance, discussed below.
[24] Mackinlay, 'Event Studies,' supra note 11 at 21.
[25] Many studies have been restricted to the largest of the US exchanges – i.e. securities listed on the NYSE and Nasdaq; Ronald C Lease and Wilbur G Lewellen, 'Market Efficiency across Securities Exchanges' (1982) 34 J Econ & Bus 101, at 101. The widely used CRSP value-weighted index incorporates share price data from the NYSE, NYSE American (formerly the AMEX), Nasdaq, and ARCA, which makes it top heavy in very large public companies. See Center for Research in Security Prices, 'Stock File Indexes' online: http://www.crsp.org/products/documentation/stock-file-indexes> ['CRSP']. CRSP is the Center for Research in Security Prices at the University of Chicago Booth School of Business.

markets are efficient in the semi-strong form[26] (although not in the strong form[27]). However, the applicability of these studies to the Canadian market is questionable. Below, I present data indicating that the average Canadian public company is much smaller than the average American public company. Small size is highly correlated with many variables that are consistent with market *in*efficiency (such as a high proportion of retail investors, few or no analysts, a dearth of short selling, wide bid/ask spreads, and few market makers). The comparatively small size of Canadian companies thus advises caution in relying on studies employing U.S. data. It also presents a *prima facie* case that many Canadian companies can be expected to trade in markets that are *not* semi-strong form efficient.

3. Statistical Significance

a. The Test for Statistical Significance

An observed correlation between independent and dependent variables (here, respectively, the announcement and any contemporaneous price change in the issuer's shares) may or may not indicate an underlying causal relationship. It may simply be the result of chance. To distinguish between situations in which a correlation results from mere happenstance and where it indicates a true causal relationship, statisticians employ the concept of 'statistical significance'.

Testing for statistical significance begins with defining a 'null hypothesis' which is that there is *no* relationship between the independent and dependant variables (in this case, the arrival of new information and any contemporaneous price change). The object of the statistical analysis is to either confirm or reject this hypothesis. Conceptually, the null hypothesis will only be rejected if it is improbable that an observed correlation between the arrival of the new information and a contemporaneous price change is purely the result of chance.

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[26] See e.g. Burton G Malkiel, 'The Efficient Market Hypothesis and Its Critics' (2003) 17 J Econ Per 59; Andrew W Lo, 'Efficient Markets Hypothesis' in Macmillan Publishers Ltd ed, *The New Palgrave Dictionary of Economics*, 3rd ed (London: Palgrave Macmillan UK, 2018). The efficient markets hypothesis is not without its critics, however. See Andrew W. Lo, 'Reconciling Efficient Markets with Behavioral Finance: The Adaptive Markets Hypothesis' (2005) 7 J Investment Consulting 21.

[27] However, insider trading by knowledgeable insiders has been shown to move the market price in the direction of its new equilibrium once the privileged information becomes public. See e.g. Lisa K Meulbroek, 'An Empirical Analysis of Illegal Insider Trading' (1992) 47 J Fin 1661 [Meulbroek, 'Empirical Analysis']; Arturo Bris, 'Do Insider Trading Laws Work?' (2005) 11 Eur Fin Mgmt 267 [Bris, 'Insider Trading']. See also HN Seyhun, 'Why does aggregate insider trading predict future stock returns?' (1992) 107 Quar J of Econ 1303.

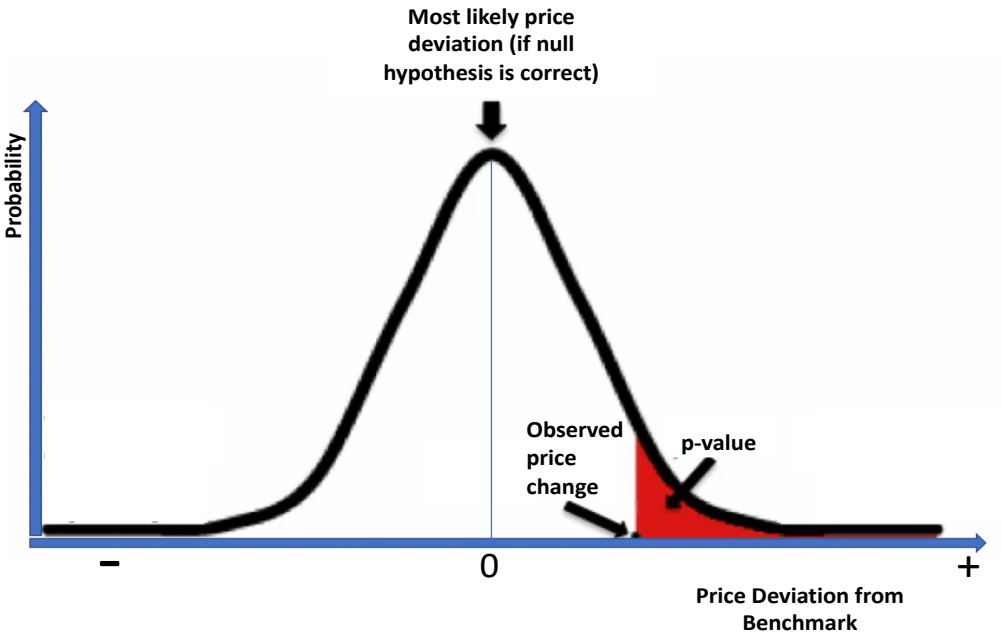
Chart 1 provides a visual representation. The normal or 'bell curve' distribution is, in essence, a graphical illustration of the null hypothesis. If the null hypothesis holds, then the announcement in question will be expected to produce no change in the price of the issuer's shares (corrected for market movements). Thus, as indicated in chart 1, the 'most likely price deviation (if null hypothesis is correct)' is zero. However, purely by chance (or as a product of the vagaries of measurement) the observed price deviation may depart from the mean in either the positive or negative direction. The normal distribution expresses the intuition that price observations that depart further and further from the mean (i.e. zero deviation) are less and less likely to occur. The idea that underlies the concept of statistical significance is that when the observed deviation departs sufficiently far from the mean, it is appropriate to abandon the null hypothesis and embrace the counter-hypothesis that there is actually a causal relationship between the arrival of new information and the observed price change.

More formally, an observed price change will be statistically significant only if the likelihood of a 'type I' error is small. A type I error occurs when the null hypothesis is true, but is mistakenly rejected (a so-called 'false positive'). That is, the statistician concludes that the announcement produced a correlative price change, when in fact it did not. In order to guard against this kind of error, the statistician will only reject the null hypothesis if the likelihood of a false positive is less than some generally accepted threshold (referred to as the 'level of significance' or alternatively by the Greek letter 'α'). The most commonly employed level of significance in statistical studies is 0.05 (i.e. 5%).

The actual probability of a type 1 error in respect of a given data set is generated by the statistical procedure itself, and is commonly referred to as the 'p-value'. Hence, if the p-value is less than 0.05, the price change is considered to be statistically significant.

This is illustrated in chart 1. The 'observed price change' in this case materially deviates from the mean. Whether or not this price change is statistically significant, however, depends on the area of the graph that is shaded in red (the entire area under the curve to the right of the observed price change). That area is equal to the p-value associated with the observed price change. If this p-value is equal to or less than 0.05 of the total area under the distribution to the right of the mean, then the observed price change is statistically significant.

CHART 1[28]



b. Type II Errors and the 'Power of the Test'

There are a number of factors that impact on the statistical robustness of ESM. One of these is the 'power' of the statistical test, which is driven by the probability of a 'type II' error. A type II error (or 'false negative') arises when there is an underlying causal relationship between the independent and dependent variables,

[28] This diagram depicts a 'one-tailed' test, although it is also possible to have a 'two-tailed' test. In a two-tailed test, the tester is not sure if any observed deviation from the mean will be positive or negative. In this case, the 5% level of significance is divided between the two tails (i.e. 2.5% each). This makes it more difficult to find statistical significance in either direction. A one-tailed test is more appropriate when the tester believes that the observed deviation from the mean can only be in one direction. In this case, the entire 5% level of significance is embedded in the one tail, increasing the statistical power of the test by making it more likely that the p-value will fall within the area of statistical significance. In the context discussed in this paper, a one-tailed test is appropriate. See generally David B Pillemer, 'One- Versus Two-Tailed Hypothesis Tests in Contemporary Educational Research' (1991) 20 Educational Researcher 13; John E Freund & Benjamin M Perles, *Modern Elementary Statistics,* 12th ed (New Jersey: Prentice Hall, 2006) at 293 *et seq.*

but the statistician incorrectly concludes that there is no such relationship (i.e. he/she accepts the null hypothesis when in fact it is false). The likelihood of a type II error is $1 - \beta$, where β is the 'power of the test'. β is equal to the probability of correctly rejecting the null hypothesis when the null hypothesis is in fact false.[29]

The power of the test depends on a variety of factors. One of these is the sample size.[30] Unfortunately, when ESM is used in the type of litigation contemplated here, the sample size is invariably one. This small sample size decreases the power of the test, which results in a greater likelihood of a type II error. That is, there is a higher probability of failing to reject the null hypothesis, when the null hypothesis is in fact false.

The power of the test also diminishes as the size of the price change resulting from new information grows smaller,[31] and as the size of the event window grows larger.[32]

When statistical power is low, the statistician is more likely to embrace the null hypothesis when it is in fact false; i.e. the test is less likely to yield statistical significance, even if there is an underlying causal relationship. One strategy to deal with a low-power test arises out of the fact that there is a trade-off between type I and type II errors. Increasing the level of significance increases the likelihood of a type I error, but diminishes the chance of a type II error, increasing the power of the test.[33]

This emphasizes a point of general importance, which is that it is a mistake when interpreting the results of an event study to pay attention only to the likelihood of a type I error (i.e. the level of significance). Many single-firm event studies conducted on firms that trade in informationally inefficient markets and with long

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[29] Kevin R Murphy, Brett Myors & Allen Wolach, *Statistical Power Analysis: A Simple and General Model for Traditional and Modern Hypothesis Tests* (New York; Routledge, 2014). Brown and Warner state:

> Power is the probability, for a given level of Type I error and a given level of abnormal performance, that the hypothesis of no abnormal performance will be rejected. Since a test's power indicates its ability to discern the presence of abnormal performance, then all other things equal, a more powerful test is preferred to a less powerful test.

Brown and Warner, 'Measuring,' supra note 19 at 206.

[30] Mackinlay, 'Event Studies,' supra note 11 at 28-32.

[31] Mackinlay, 'Event Studies,' supra note 11 at 28-32; Brown and Warner, 'Measuring' supra note 19.

[32] Mackinlay, ibid; Brown and Warner, ibid.

[33] See generally SP Kothari and JB Warner, 'Econometrics of Event Studies' in William T Ziemba, ed, *Handbook of Empirical Corporate Finance* (Amsterdam: Elsevier, 2007); Mackinlay, 'Event Studies,' supra note 11 at 28-32.

event windows will have low statistical power. It may be quite justified in these circumstances to define statistical significance at the 10%, rather than the 5% level.

Another factor that impacts the power of the test is the degree to which trading in a given issuer's shares is dominated by retail 'noise traders'; the greater the proportion of retail investors, the lower the power of the test. This is discussed further below, in Parts B.3 and E.8.

C. The Two Foundational Event Dates for Using ESM

Whether secondary market liability is the product of a misrepresentation or a FTMTD, the damages suffered by the plaintiff are measured by the impact of the misrepresentation (or FTMTD) on the price of an issuer's securities. If an issuer's securities trade in a semi-strong form efficient manner, then any new information should cause the price of the issuer's securities to change virtually instantaneously. In the case of a misrepresentation, this naturally suggests two foundational event dates for measuring damages; the date of the initial misrepresentation ('DM1') and the date of the corrective announcement ('DM2'). In the case of a FTMTD, no price change will occur on the date of the FTMTD, so only DM2 is available.

Both DM1 and DM2 yield short and cleanly defined event window, and are both likely to be free of contamination by one or more of the various factors discussed in Part E below (such as confounding events).[34] In theory, they should yield the same result. In practice, however, the relative utility of DM1 and DM2 may vary depending on the degree to which either is contaminated by confounding events or other factors. This is discussed further below.

Where an issuer's securities do not trade in a semi-strong form efficient manner, DM1 and DM2 remain the foundational event dates at which to measure damages. However, in this case a longer event window must be employed, increasing the likelihood of contamination by more or more of the factors discussed in Part E below.

[34] In addition, if the exogenous market movement is much greater in respect of either DM1 or DM2, the window with the smallest market movement should preferentially be used. While the ESM is designed to control for market movements, the likelihood of error is greater when there is a significant market movement over the event window, as the subtraction of the market movement from the raw price change is more dependent not only on the accuracy of the calculation of the issuer' beta coefficient, but on the stability of that coefficient over time (since beta is calculated from historical price data).

For each of the four basic secondary market liabilities, table 1 indicates the availability of DM1 and DM2.

TABLE 1
THE LIABILITY SPECTRUM

Event Type, and Some Possible Motivations for the Mis-disclosure or Non-disclosure **MR → misrepresentation** **Failure to Make Timely Disclosure → FTMTD**	**Who Suffers a Loss?**	**Who Does Not Suffer a Loss?**	**OSA Liability Window (Defining Persons Eligible to Sue)**	**Available Damages Measures**
MR of Good News (causing price to rise) ***Some Possible Motivations*** -issuer anticipates raising money in the new future[35] -issuer anticipates effecting or being subject to a takeover bid or merger[36] -insiders wish to sell securities at a favourable price -insiders wish to exercise options to purchase securities at a favourable price and resell them at higher market price -insiders seeks to secure higher year-end bonuses	Persons who purchase securities *after* the MR and do not sell prior to the corrective announcement	Persons who purchase securities before or after MR, and who sell them prior to the corrective announcement	-s.138.3[37] -liability window commences on the date of the MR -liability window ends on the date of the corrective announcement	DM1 DM2
FTMTD of Bad News ***Some Possible Motivations*** -issuer anticipates raising money in the new future -insiders wish to sell securities at a favourable price -insiders wish to exercise options to purchase securities at a favourable price and resell them at higher market price -insiders seeks to secure higher year-end bonuses	Persons who purchased securities *after* the FTMTD, and who do not sell before the corrective announcement	Persons who held securities prior to FTMTD, or who purchased them *after* the FTMTD, but who sell *prior to* the corrective announcement	-s.138.3(4) -liability window commences on the date of the FTMTD -Liability Window ends on the date of the corrective announcement	DM2
MR of Bad News (causing share price to fall) ***Some Possible Motivations*** -insiders wish to buy at an artificially low price -insiders wish to secure stock options (or equivalent) at artificially low price	Persons who held securities at the time of the MR, and who sell *prior to* the corrective announcement	Persons who held securities at the time of the MR, and who *do not sell prior to* the corrective announcement	-s.138.3[38] -liability window commences on the date of the MR -liability window ends on the date of the corrective announcement	DM1 DM2
FTMTD of Good News ***Some Possible Motivations***	Persons who held securities at the time of the FTMTD, and who	-Persons who held securities at the time of the FTMTD, or who	s.138.4(3)	DM2

-insiders wish to purchase shares at low price prior to announcement of good news	sell *prior to* the corrective announcement	purchase them between the FTMTD and the corrective announcement, and who do not sell until after the corrective announcement (the latter experience a windfall gain)		

[35] Whether the issuer plans to raise money in the primary or secondary market, new securities will typically be priced at or near the extant market price.
[36] An issuer making a takeover bid might wish to use its own shares as currency, rather than cash. Similarly, if a merger is anticipated, a higher share price will result in the issuer's shareholders securing a larger share of the merged entity. An issuer that anticipates a hostile takeover bid might wish to artificially inflate its share price, either to drive the acquirer off or to secure a higher acquisition price.
[37] s 138.3(1) (documents released by responsible issuer); s 138.3(2) (public oral statements by responsible issuer); s 138.3(3) (release of documents or public oral statement by influential person).
[38] s 138.3(1) (documents released by responsible issuer); s 138.3(2) (public oral statements by responsible issuer); s 138.3(3) (release of documents or public oral statement by influential person).

D. When Should Damage Assessments be Individualized?

1. Efficient Market

In an efficient market with essentially instantaneous adjustment of share prices to new information, the effect of any misrepresentation or FTMTD affects all potential plaintiffs equally. Thus, damage assessments *should not* be individualized.

2. Inefficient Market

An inefficient market with correlative slow response of share price to new information necessitates the individualization of damages to each plaintiff. Suppose, for example, that ABC's share price is $100 per share. Then, on January 1, ABC makes a misrepresentation of good news. The share price adjustment, however, takes 5 days, steadily increasing by $1 per day from January 1 to January 5 before it settles at a new equilibrium of $105. Then, on January 20, a corrective announcement is made, and the share price steadily decreases by $1 per day until it once again settles at $100 per share on January 25. Suppose further that plaintiff A purchases shares on January 1 at $101 per share, while plaintiff B purchases shares on January 5 at $105 per share. Further suppose that both sell their shares on January 25, after the downward price adjustment was complete. In this case, plaintiff A has suffered only $1 in damages, since she purchased shares at $101 and sold them at $100. Plaintiff B, however, suffers $5 damages, since he purchased at $105 and sold at $100. Both the purchase and sale prices must be taken into account.

One can easily change the facts so that A and B buy their shares on the same day at the same price, but sell them on different days following the corrective announcement. Once again, the damages are different, and depend on both the purchase and sale price. There are obviously further permutations and combinations involving varied dates of purchase and sale. And indeed, within the pool of eligible plaintiffs, some might actually benefit from the misrepresentation, such as a plaintiff who purchases her shares on January 1 at $101 and sells them on January 21 for $104. Thus, correct damage calculations for all plaintiffs requires individualized evidence as to when each plaintiff actually bought and sold their shares.

E. Complications in the Use of Event Study Methodology

1. Inefficient Trading

In this section, I review a variety of firm-specific and fact-specific factors that must be taken into account in using ESM. Foremost among these is inefficient trading.

If a firm's securities do not trade in a semi-strong form efficient manner, any price adjustment to new information will be non-instantaneous. If this is the case, the event window must be expanded to include the period of time extending from the event until the price adjustment is complete. The latter cannot be determined by theory. Rather, a first approximation of the appropriate event window can be made from visual inspection of the data, followed by testing a variety of event windows for statistical significance. In general, the less efficient the market for the firm's securities, the longer it will take for the price adjustment to be complete. The delay until full impoundment of new information into share price can be a period of days or even weeks.[39]

As noted in the sections that follow, inefficient trading and the resulting slow response of price to new information greatly raises the likelihood that other complications will occur in the use of ESM, such as the occurrence of confounding corporate events.

2. Confounding Events[40]

A complication arises in the assessment of damages if the public announcement of new information is not 'clean'; i.e. it is contaminated by other confounding events that may have had an impact on share price. A confounding event may be internal to the corporation (such as an announcement related to earnings) or external (such as an announcement by a competitor of the introduction of a game-changing new product).

[39] Robert M Brown, 'A Comparison of Market Efficiency Among Stock Exchanges' (1988) 15 J of Bus & Fin 373 (finding that the share price adjustment to the announcement of a change in depreciation method took approximately one month longer for AMEX and OTC stocks than for NYSE stocks).
[40] Despite the importance of controlling for confounding events, Williams and Siegel find strong evidence that many researchers do not check their data for such events; McWilliams and Siegel, supra note 12 at 631-633.

a. Non-Contemporaneous Confounding Events

A confounding event may be contemporaneous (within the chosen event window) or non-contemporaneous (occurring outside that window). The latter is illustrated by the following example. Suppose that Issuer A's share price is $100 per share. On January 10 ABC Corp publicly and knowingly misrepresents that it has achieved a handsome profit in its fourth quarter, when in fact there is a substantial loss. On the date of the misrepresentation, the market price rises to $120 per share, and the following day the plaintiff purchases shares of ABC at that price. Then, on January 15, before the correction of the misrepresentation, ABC publicly announces that it has just entered into an employment contract with a highly respected CEO, and the public share price rises to $130. Then, on January 20, just after the close of markets, the misrepresentation concerning fourth quarter earnings is made public; at the start of trading on January 21, the price of ABC's shares drops to $110. The plaintiff sells all her shares at this price.

Non-contemporaneous confounding events such as that occurring in this hypothetical are not problematic when ESM is used to calculate damages, irrespective of whether DM1 or DM2 is used. This is because, by definition, the confounding event occurs outside the event window and has no impact on the calculation of damages. Thus, when ESM is employed, the hiring of the new CEO will not prejudice the damage calculation.

Non-contemporaneous confounding events may seriously skew the estimate of damages, however, when damages are computed using a procedure such as that found in the OSA. Under the OSA, the measure of damages[41] is the raw difference between the price at which the plaintiff purchased the securities (in the example above, $120) and the price at which she disposed of those securities ($110), yielding damages of $10 per share. This is obviously an incorrect measure. Whether the event date is DM1 or DM2, ESM indicates that the plaintiff should receive damages of $20 per share.[42] The source of the error is a confounding event that is unrelated to the misrepresentation. This problem is discussed further in Part G.

[41] OSA s 138.5(3) states, 'assessed damages shall not include any amount that the defendant proves is attributable to a change in the market price of securities that is unrelated to the misrepresentation or the FTMTD' allowing the defendant (but not the plaintiff) to displace this *prima facie* measure of damages.
[42] In this example, I make the simplifying assumption that there are no contemporaneous market movements.

b. Contemporaneous Confounding Events

ESM is greatly complicated by the occurrence of a confounding event within the event window. Suppose that in the above example ABC does not announce the hiring of the talented new CEO on January 15, but on January 20 at the close of markets, at precisely the same time as the public correction of the January 10 misrepresentation. We can readily assume that, as before, ABC's shares will trade at $110 at the opening of markets on January 21. In this case, however, it is very difficult to disentangle the effects of the two simultaneous announcements on share price. The only way to exclude the confounding event is to make an estimate of its impact on ABC's share price. This might theoretically be done by using ESM to make an educated guess at the impact of the confounding information by examining the price impact of similar announcements in the past. However, it will be virtually impossible to find another event that is truly representative of the firm's position and the market conditions prevailing on the event date. Another strategy might be to use discounted cash flow methodology to arrive at an estimate.[43] Whatever method is employed, however, it is likely to result in wide confidence intervals and low statistical power.

c. Confounding Events and Long Event Windows

Obviously, the longer the event window, the greater the likelihood that a confounding event will contaminate the calculation of damages. Locating such events requires a high degree of diligence on the part of the researcher. A comprehensive search should be made of the issuer's own website, stock exchange reports of material events and dividends, business media, and the issuer's publicly filed documents (with a particular focus on the issuer's material change reports[44]) in an attempt to identify corporate or other events within the event window that might conceivably have an impact on the issuer's share price.

d. Confounding Events and Beta Estimation

Confounding corporate events may arise not only during the event window, but in the period (most usually 100-200 days prior to the event window) during which a firm's beta is estimated. While this is generally not a large problem when an event

[43] See generally Tim Koller, Marc Goedhart & David Wessels, *Valuation: Measuring and Managing the Value of Companies,* 7th ed (New York NY: McKinsey & Company Inc, 2020); Shannon Pratt, Robert F Reilly & Robert P Schweihs, *Valuing a Business,* 4th ed (New York NY: McGraw-Hill Professional, 2000).

[44] These may be searched in Canada at sedar.ca and in the United States at edgar.com.

study is conducted in relation to a large pool of firms, it can seriously skew the estimation of beta in single firm studies.[45] A search should be made of those sources just noted to identify confounding events in the beta estimation period, and appropriate corrections made.

3. Bundling of Information

The likelihood of contemporaneous confounding events is exacerbated by the fact that an issuer that is poised to make a corrective announcement has a potent incentive to reduce its potential liability by opportunistically coupling the corrective announcement with offsetting good news. There is evidence that this type of bundling reduces the likelihood of litigation and leads to lower settlements when litigation occurs.[46] Indeed, by clouding the determination of damages, bundling of bad news with additional bad news has the same effect.[47]

Because of the difficulty of separating the price effects of contemporaneous corporate announcements, the rules should require that the public correction of a prior misrepresentation (or FTMTD) be made as a discrete corporate announcement unaccompanied by any other disclosure. The penalties for violation of this rule should be non-trivial and individualized to all persons who participate in, or acquiesce in any bundled disclosure. In addition, the rules should specify that the board of directors must approve such disclosure, not only to ensure compliance with the 'single disclosure' rule, but to create a potential liability for all corporate directors if the rule is broken.[48]

4. Insider Trading Prior to the Corrective Announcement

[45] Scott Hakala, 'Lessons from Single-Company Event Studies: The Importance of Controlling for Company-Specific Events' (December 4, 2017), online: SSRN <https://ssrn.com/abstract=3083495 or <http://dx.doi.org/10.2139/ssrn.3083495>; John D Jackson, Audrey D Kline & Sarah J Skinner, 'The Impact of Non-Normality and Misspecification on Merger Event Studies' (2006) 13 International Journal of the Economics of Business 247.

[46] Barbara A Bliss, Frank Partnoy & Michael Furchtgott. 'Information bundling and securities litigation' (2018) 65 J. Acct & Econ 61.

[47] Ibid.

[48] One objection to a rule of this character is that it might require the issuer to make untimely disclosure of material information unconnected with the misrepresentation (or its correction). However, in such a case, the issuer may file a confidential report with securities regulators, wait a period of time sufficient for the corrective announcement to be fully digested by the market, then announce the unconnected material information. See OSA ss 75(3), (4), (5); NI 51-102 ('Continuous Disclosure Obligations') Part 7.

Share prices may move *prior* to the announcement of new information if knowledgeable insiders (and/or tippees) have sought to exploit their inside information by trading in the market prior to the announcement. The impact of such trading can be substantial. Meulbroek, for example, found that where insider trading preceded a public announcement, on average the issuer's share price moved half as much as on the actual announcement date (i.e. one-third of the total share price adjustment).[49] The effect of pre-announcement insider trading on share price must be taken into account in determining the magnitude of the market reaction to the correction of a misrepresentation (or revelation of a FTMTD).

5. Rational Market Anticipation Prior to the Corrective Announcement

Aside from insider trading, the market price of an issuer's securities may change in advance of a public announcement because of rational market anticipation based on publicly available information. This might happen, for example, if a media report, or perhaps a multitude of media reports over a period of time raise the possibility that a misrepresentation or FTMTD has occurred. It might also happen if securities regulators announce the convening of a hearing to examine whether a misrepresentation or FTMTD occurred. In either scenario, an issuer's price may begin to adjust prior to any corrective announcement by the issuer.

As with insider trading, the effect of this type of pre-announcement change in price greatly complicates the calculation of damages, and requires that expert witnesses take care to determine whether corrective information arrived in a single discrete event or in a series of events, and adjust the event window appropriately (or treat each contributory event as a separate event and sum the results).

6. Market Overreaction[50]

[49] Meulbroek, 'Empirical Analysis,' supra note 27. See also G William Schwert, 'Markup Pricing in Mergers and Acquisitions' (1996) 41 J Fin Econ 153 (finding substantial pre-announcement runups in share prices preceding acquisition announcements); Bris, 'Insider Trading,' supra note 27. Bris's study examined 4,451 merger or acquisition announcements in 52 countries, and he found substantial runups in price preceding public M&A announcements. Moreover, Canada was the hands-down winner of the insider trading sweepstakes, with an average pre-announcement price runup of 35.18%, distantly followed by Hong Kong (3.44%) and Norway (2.33%).

[50] Overreaction was first noticed by R Thaler & WFM De Bondt, 'Does the Stock Market Overreact?' (1985) 40 J Fin 793 [Thaler & De Bondt]. It may correct itself in the short term (i.e. a period of days; see e.g. Yulong Ma, Alex P Tang and Tanweer Hasan, 'The Stock Price Overreaction Effect: Evidence on Nasdaq Stocks' (2005) 44 Quar J Bus & Econ 113) [Ma et al], showing overreactions lasting no longer

a. Informationally Efficient Market

There is evidence that even for companies whose share prices are determined in an informationally efficient market, there may be some initial overreaction of share price to new information.[51] If the overreaction has not fully dissipated by the end of the event window, this will lead to an overstatement of damages.

Price overreactions seem to be confined to very large gains and losses.[52] Moreover, in most cases, the magnitude of the overreaction is smaller than the bid-ask spread[53] and lasts no longer than a small number of trading days.[54]

Nonetheless, in an efficient market, the event window may be as short as a single day. Thus, if there is evidence of market overreaction that is both economically and statistically significant, consideration should be given to expanding the event window to allow the overreaction to fully dissipate.

b. Informationally Inefficient Market

It has been hypothesized that market overreaction is a product of psychological factors, and that these factors are more at play for smaller firms.[55] This hypothesis

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than 2 days); the medium term (ie several months or a year; see e.g. R Ali, Z Ahmad & SV Anusakumar, 'Stock market overreaction and trading volume: Evidence from Malaysia' (2012) 7 Asian Acad Man J of Act & Fin 103, showing overreactions lasting 1-52 weeks); or the long term (eg Thaler and De Bondt, ibid, showing overreactions lasting 3 years or more). Given that event windows are typically no longer than a period of days, I focus on studies showing short-term overreaction.

[51] See e.g. Ma et al, supra note 50; Narasimhan Jegadeesh and Sheridan Titman, 'Overreaction, Delayed Reaction, and Contrarian Profits' (1995) 8 Rev Fin Stud 973; B Lehmann, 'Fads, Martingales and Market Efficiency' (1990) 105 Quar J Econ 1; N Jegadeesh, 'Evidence of Predictable Behavior of Security Returns' (1990) 45 J Fin 881.

[52] For example, Ma et al find that overreactions in their sample of Nasdaq stocks occurred only in respect of events that produced CARs of + or – 20% or greater; see Ma et al supra note 50.

[53] Aigbe Akhigbe, Thomas Gosnell & T Harikumar, 'Winners and Losers on NYSE: A Re-Examination Using Daily Closing Bid-Ask Spreads' (1998) 21 J Fin Research 53.

[54] See Ma et al supra note 50 (overreaction dissipates after 2 trading days). It is noteworthy that much of the pertinent research on share price overreactions pre-dates the internet era. The advent of ubiquitously available and extremely fast and reliable internet (and other electronic) communications has no doubt had a favorable effect on market efficiency, thus mitigating share price over-reactions to new information in an informationally efficient market.

[55] Daniel Kent, David Hirshleifer & Avanidhar Subrahmanyam, 'Investor Psychology and Security Market under- and Overreactions' (1998) 53 J Fin 1839; David Hirshleifer, 'Behavioral Finance' (2015) 7 Ann Rev Fin Econ 133. See also Brad M Barber and Terrance Odean, 'The Behavior of Individual Investors' in George M Constantinides, Milton Harris & Rene M Stulz, eds, *Handbook of the Economics of Finance* (Amsterdam: Elsevier Science, 2013) [Barber and Odean, 'Individual Investors'], vol 2B at ch 22.

accords with the empirical data canvassed earlier showing that the trading in small firms is dominated by retail traders, and that these retail traders are mostly noise traders.[56] This suggests that overreaction will occur more frequently and with a greater magnitude for smaller public firms.

However, in an inefficient market, share prices adjust slowly to new information. Thus, against a background of *under*reaction, it is not at all clear how short term *over*reaction would manifest itself. For this reason, there does not appear to be either a theoretically or empirically sound methodology for taking price overreaction into account.

7. Multiple Secondary Market Failures and Multiple Classes of Plaintiffs

The class of potential plaintiffs is defined by what might be styled the 'Liability Window'; only those persons who purchase (or sell, as the case may be) securities during the Liability Window have a cause of action. The Liability Window commences on the occurrence of a misrepresentation or FTMTD and terminates when a corrective announcement is made.

Unfortunately, not all misrepresentations occur as single discrete events. Some may take place over a series of pronouncements or statements. Suppose, for example, that ABC Inc. announces[57] on January 10 that it expects an operating loss for the previous quarter of $75 million, when in fact it knows that the operating loss will be $250 million. Assuming that the market anticipated a break-even quarter, this announcement should cause the share price to fall,[58] although obviously not by as much as it would have fallen if the truth had been known. Further suppose that (perhaps in response to a critical investigative report published in the financial press) on February 1 ABC makes a further announcement that the loss in the fourth quarter is expected to be $175 million (when ABC still expects the loss to be $250 million). Then, on March 1, the interim financial statements for the fourth quarter are filed, and these show the full extent of the $250 million loss.

In this hypothetical, there are two misrepresentations bearing on the same subject matter. Both representations deliberately understate the extent of the fourth quarter

[56] Supra Part E.9.
[57] By 'announces' I mean that ABC files a news release and material change report as required by Canadian securities laws. See e.g. OSA s 75.
[58] In an efficient market, the market's expectation of results should be reflected in the share price prior to any announcement.

loss, although the second announcement *partially* corrects the inaccuracy of the first. In this case, there are a number of different classes of purchasers and hence potential plaintiffs.

1. Persons who purchase securities in ABC after the January 10 misrepresentation but who sell prior to the February 1 announcement suffer no damages.
2. Persons who purchase securities in ABC after the January 10 misrepresentation and prior to the February 1 announcement, and who sell *before* the March 1 correction suffer damages measured by the drop in price occasioned by the February 1 announcement.
3. Persons who purchased securities in ABC after the January 10 misrepresentation and prior to the February 1 announcement, and who sell *after* the March 1 correction suffer damages measured by the drop in price occasioned by the February 1 announcement plus the drop in price occasioned by the March 1 announcement.
4. Persons who purchase securities in ABC after the February 1 announcement but who sell *before* the March 1 correction suffer no damages.
5. Persons who purchase after the February 1 announcement and who sell *after* the March 1 correction suffer damages equal to the drop in price occasioned by the March 1 correction.
6. Persons who purchase after the February 1 announcement and have not sold their securities at the time of trial suffer damages equal to the price drop resulting from the March 1 correction.

Many similar scenarios can be imagined involving the division of a misrepresentation into any number of cumulative events. The misrepresentations may be *additive* rather than subtractive (e.g. the January 1 misrepresentation is that the operating loss will be $200 million, while the February 1 announcement is that it will in fact be just $100 million). In general, there will be as many Liability Windows as there are different additive or subtractive misrepresentational events.

8. Disjunction Between the Misrepresentation or FTMTD and the Corrective Announcement

Earlier, I indicated that there were two foundational measures of damages; the date on which the misrepresentation is made (DM1), and the date on which the correction of the misrepresentation or FTMTD (DM2) occurs. Only the second measure is available in the case of a FTMTD, since no price adjustment occurs on

the date of such failure. However, where there is a misrepresentation, the statistician may choose one or the other means of measuring damages, or both.

At first blush, there is no reason in principal to prefer one measure over the other. The main concern is to identify an event that is 'clean'; that is, uncontaminated by confounding corporate movements or anticipatory price adjustments. Depending on the facts, one or other measure of damages may better satisfy this criterion. In some cases, the first measure will be strongly preferred. This occurs when there is a disjunction between the misrepresentation and the corrective announcement.

To illustrate the point, I will once again assume that on January 10, ABC's best information is that its loss for the fourth quarter will be $250 million. On that date, ABC knowingly and falsely represents that its quarterly loss is expected to be $100 million. However, in late February, ABC receives new and better information - that it could not have acquired earlier with any amount of due diligence[59] - that the fourth quarter loss will actually be $500 million. On March 1, ABC makes public its interim financial statements for the fourth quarter, and these reveal the full $500 million loss.

The difficulty in this case is that the corrective announcement on March 1 produces a drop in price of ABC's securities that is not uniquely attributable to the January 1 misrepresentation. It also reflects the new and better information acquired in late February concerning the actual extent of the loss. Disentangling the two components of the price drop is not at all straightforward.

It cannot simply be assumed that the price drop attributable to a $500 million loss will be twice that attributable to a $250 million loss. The relative price drops depend entirely on how large the corporation is, its ability to absorb various losses, and the relative damage that each loss causes to the corporate enterprise.[60] The loss function cannot be assumed to be linear. For example, the occurrence of a $500 million loss – but not a smaller $250 million loss – might put the issuer offside pertinent debt covenants and drive it into receivership or bankruptcy. Should this be the case, the $500 million loss will result in more than twice the harm to the corporation than the $250 million loss.

[59] That is, the failure to make disclosure of this information at an earlier date does not amount to a misrepresentation.
[60] See e.g. Sanjai Bhagat, John Bizjak & Jeffrey Coles, "The Shareholder Wealth Implications of Corporate Lawsuits," (1998) 27 Fin Mgmt 5.

Other examples of disjunction arise where the importance of the misrepresentation or FTMTD changes over time with the firm's changing fortunes. Suppose, for example, that the CEO of ABC Inc. knowingly misrepresents on January 1 that ABC's engineers have patented a new generation of computer chip that will make ABC's chips three times faster than those of any competitor. In response to this representation, ABC's stock price rises from $10 per share to $20 per share. In fact, while patents have indeed been granted in several countries, the new chip technology will, at the very best, give ABC chips the same speed as those of its competitors. Then, on March 1, ABC unexpectedly announces that hundreds of millions of dollars have been stolen by its senior management team, rendering the firm deeply insolvent. As a result, ABC has ceased all operations and filed for bankruptcy. The stock price goes to $0.10 per share. The next day, ABC publicly discloses that the CEO's announcement on January 1 was false. In response, the share price of ABC does not change; the import of the earlier misrepresentation is rendered essentially moot by subsequent firm developments. While this is an extreme example, one can imagine many other scenarios where the import of a misrepresentation either increases or decreases because of subsequent changes in the firm's fortunes.

Changes in prevailing market conditions may have a similar impact. Suppose, for example, that XYZ, a purveyor of luxury gemstones, falsely represents that it has discovered a means to reduce the cost of cutting diamonds of 5 carats or greater by 75%. As a result, XYZ's stock price increases from $10 to $12. In fact, XYZ is *working on* the described technology, but is still at least a year or two away from making it work (if indeed it can be made to work).

In the next several months, the economy unexpectedly goes into a deep recession. Since large diamonds have a very high income elasticity of demand, the market for such diamonds shrinks to almost nothing. As a result, XYZ's share price sheds the $2 increase resulting from the misrepresentation – plus (given its high beta) another $4 per share, leaving the price at $6 per share. Then, on June 1, XYZ makes a corrective announcement. The share price falls by $0.25 to $5.75.

In this scenario, general economic conditions have a material impact on the import of previously disclosed firm-specific information, rendering the magnitude of the price change in response to the corrective announcement far less than the magnitude of the price change that accompanied the initial misrepresentation.

In all of the above cases, DM2 (the change in share price on the date of the corrective announcement) becomes an ineffective - and in fact highly misleading -

means for measuring damages. The only market measure of damages that is available is DM1 (the change in share price at the time of the misrepresentation).

9. Statistical Significance and Noise Trading: the Curse of the Retail Investor

In an inefficient market, a longer event window must necessarily be used. As noted earlier, this has the effect of reducing the statistical power of ESM. In this section, I discuss another cause of low statistical power – the presence of high levels of noise trading.

In general, as the ratio of signal to noise in the data decreases, the power of the test also decreases.[61] That is, it becomes more difficult to establish a statistically significant relationship – even if one actually exists.

The 'signal' in this case is the underlying relationship between the corrective announcement and any contemporaneous price change. The 'noise' consists of random variations in the data caused by external factors that are uncorrelated with the underlying signal. The lower the signal to noise ratio in any given data set, the greater the likelihood of a type II error; that is, the greater the likelihood that the null hypothesis (that the announcement produced no price change) will be accepted, when in fact it is false.[62]

One of the most significant sources of noise in financial markets is the price pressure exerted by uninformed buy and sell orders submitted by 'noise traders'. Noise traders are those who believe that they are trading on valuable information that will help them identify over-valued and under-valued securities, when in fact they have no such information. As expressed by Fischer Black (the progenitor of the concept of noise trading);[63]

> In my basic model of financial markets, noise is contrasted with information. People sometimes trade on information in the usual way. They are correct in

[61] F Black, 'Noise' (1986) 41 J Fin 528 [F Black, 'Noise']; KF Hasselmann 'On the signal-to-noise problem in atmospheric response studies' in *Joint Conference of Royal Meteorological Society, American Meteorological Society, Deutsche Meteorologische Gesellschaft and the Royal Society* (Reading: Royal Meteorological Society, 1979) at 251; TJ Burkholder & RL Lieber 'Stepwise regression is an alternative to splines for fitting noisy data' (1996) 29 *Journal of Biomechanics* 235; Jan Bartholdy, Dennis Olson & Paula Peare, 'Conducting Event Studies on a Small Stock Exchange' (2007), 13 The European Journal of Finance 227.

[62] For a discussion of type I and type II errors, see Part B.3.

[63] F Black, 'Noise,' supra note 61.

> expecting to make profits from these trades. On the other hand, people sometimes trade on noise as if it were information. If they expect to make profits from noise trading, they are incorrect.

Similarly, Teall defines noise traders as those who 'trade on the basis of what they falsely believe to be special information or misinterpret useful information concerning the future price or payoffs of a risky asset.'[64]

Both theory and empirical evidence suggests that institutional traders tend to be informed traders while retail traders are noise traders.[65] Indeed, the evidence suggests that retail noise traders do more than simply fail to contribute to price discovery and informational efficiency. Rather, they often trade in a manner that leads security prices *away* from fundamental values, making financial markets *less* informationally efficient.[66]

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[64] John L Teall, *Financial Trading and Investing*, 2nd ed (Cambridge, MA: Academic Press, 2018) [Teall, *Financial Trading*], at ch 5.3. In a similar vein, Shleifer and Summers state:

> Investors who trade on noise or on popular models are worse off than they would be if their expectations were rational (if welfare is computed with respect to the correct distribution of returns). They need not lose money on average, as the simplest logic might suggest. But even if they earn higher average returns, it is because they bear more risk than they think. And even if they get rich over time, it is only because they underestimate the risk and get lucky. If investors had perfect foresight and rationality, they would know that noise trading always hurts them.

Andrei Shleifer and Lawrence H Summers, 'The Noise Trader Approach to Finance' (1990) J of Econ Per 19 at 30. See also J Lin, Y Lee & Y Liu, 'IPO auctions and private information' (2009) 31 J of Banking and Fin 1483.

[65] Michael J Brennan, 'The Individual Investor' (1995) 18 J of Fin Res 59; Robert Shiller, 'Stock Prices and Social Dynamics' (1984) Brookings Papers on Economic Activity 457; Patrick J Dennis & James Peter Weston, 'Who's Informed? An Analysis of Stock Ownership and Informed Trading' (June 4, 2001) American Finance Association Atlanta Meetings, Online: SSRN: <https://ssrn.com/abstract=267350 or <http://dx.doi.org/10.2139/ssrn.267350>; Andrei Shleifer & Lawrence H Summers 'The Noise Trader Approach to Finance' (1990) J of Econ Per 19.

[66] Alok Kumar & Charles M C Lee, 'Retail Investor Sentiment and Return Comovements' (2006) 61 J Fin 2451; Bing Han & Alok Kumar, 'Speculative Trading and Asset Prices' (2013) 48 J Fin and Quant Analysis 377; A Kumar, 'Who Gambles in the Stock Market?' (2009) 64 J Fin 1889; Shiller and Pound ibid; Brad M Barber, Terrance Odean & Ning Zhu 'Systematic Noise' (2009) 12 J Fin Markets 547 [Barber at al., 'Systematic Noise']; Barber & Odean, 'Individual Investors,' supra note 55; Tomas Reyes, 'Negativity Bias in Attention Allocation: Retail Investors' Reaction to Stock Returns' (2019) 19 Inter Rev of Fin 155 [Reyes, 'Negativity Bias']; Wei Li, Ghon Rhee & Steven Shuye Wang 'Differences in Herding: Individual vs. Institutional Investors' (2017) 45 Pacific Basin Fin J 174 [Li et al, 'Differences in Herding']. It is noteworthy, however, that Henker and Henker conclude that, despite trading on spurious rather than real information, the modest aggregate purchasing power of retail investors is insufficient to cause bubbles in stock prices when institutions also trade in such stocks; Julia Henker and Thomas Henker, 'Are retail investors the culprits? Evidence from Australian individual stock price bubbles' (2010) 16 Eur J Fin 281.

Thus, for example, there is evidence that retail investors often eschew security fundamentals[67] and trade 'attention grabbing stocks' - i.e. those that have recently been prominently featured in the financial press and/or which have experienced high abnormal trading volumes or extreme one-day returns.[68] Similarly, retail investors gravitate toward 'lottery stocks' that (like lottery tickets) have a small chance of a high payoff, are cheap to purchase, exhibit high volatility, and significantly underperform on a risk-adjusted basis.[69] Retail investors position their investment dollars on the mistaken belief that past fund performance is an indication of future performance, and that actively managed funds provide better returns than passive funds.[70] They are less capable than institutional investors of evaluating the import of new information,[71] typically do little or no stock analysis before trading,[72] and exhibit a high degree of herding behavior[73] based not on investment fundamentals but on psychology-driven factors.[74] This herding behavior – based on sentiment or 'contagion' rather than information - distorts share prices and leads them away from fundamental values.[75] When retail

[67] Benartzi and Thaler find that individuals participating in defined contribution pension plans divide their retirement savings between plan options based not on investment fundamentals, but on a simple 1/n diversification strategy given whatever n options happen to be offered by their employer; Shlomo Benartzi & Richard H Thaler 'Naive Diversification Strategies in Defined Contribution Saving Plans' (2001) 91 Amer Econ Rev 79.

[68] See e.g. Brad M Barber &Terrance Odean, 'All That Glitters: The Effect of Attention and News on the Buying Behavior of Individual and Institutional Investors' (2008) 21 Rev Fin Stud 785; Terrance Odean, 'Do investors trade too much?' (1991) 89 Amer Econ Rev 1279; Robert J Shiller & John Pound, 'Survey evidence on diffusion of interest and information among investors' (1989) 12 J of Econ Behavior and Org 4 [Shiller & Pound, 'Survey Evidence']; Barber et al., 'Systematic Noise,' supra note 66. In contrast to Barber, Odean & Zhu, who find that recent abnormal *gains* tend to spur retail trading, Reyes finds a systematic retail investor bias toward buying and selling stocks with recent highly *negative* returns; Reyes, 'Negativity Bias,' supra note 73.

[69] Alex Frinoa, Grace Leponeb & Danika Wright, 'Are paper winners gamblers? Evidence from Australian retail investors' (2019) 59 Acct and Fin 593; Bing Han & Alok Kumar 'Speculative Trading and Asset Prices' (2013) 48 J Fin and Quant Anal 37; A Kumar, 'Who Gambles in the Stock Market?' (2009) 64 J Fin 1889.

[70] James J Choi & Adriana Robertson, 'What Matters to Individual Investors? Evidence from the Horse's Mouth' (September 30, 2019) J Fin forthcoming, online: <https://ssrn.com/abstract=3462048>.

[71] Robert H Battalio & Richard R Mendenhall, 'Earnings expectations, investor trade size, and anomalous returns around earnings announcements' (2005) 77 J Fin Econ 289; Charles M C Lee, 'Earnings news and small traders: An intraday analysis' (1992) 15 J Acct and Econ 265; Neil Bhattacharya, 'Investors' trade size and trading responses around earnings announcements: An empirical investigation' (2001) 76 The Acct Rev 221.

[72] Shiller & Pound, 'Survey Evidence,' supra note 68.

[73] That is, they tend to contemporaneously buy and sell the same stocks.

[74] Alok Kumar & Charles M C Lee, 'Retail Investor Sentiment and Return Comovements' (2006) 61 J Fin 2451; Bing Han & Alok Kumar, 'Speculative Trading and Asset Prices' (2013) 48 J Fin and Quant Analysis 377; Shiller & Pound, 'Survey Evidence,' supra note 68; Barber et al., 'Systematic Noise,' supra note 66; Li et al., 'Differences in Herding,' supra note 66.

[75] See supra note 66-67 and accompanying text.

investors outperform the market, it is not typically because of superior investment skill, but as a result of adventitiously-gathered inside information.[76]

Barber and Odean[77] summarize the evidence respecting retail traders as follows:

> This research documents that individual investors (1) underperform standard benchmarks (e.g. a low-cost index fund), (2) sell winning investments while holding losing investments (the 'disposition effect'), (3) are heavily influenced by limited attention and past return performance in their purchase decisions, (4) engage in naïve reinforcement learning by repeating past behaviors that coincided with pleasure while avoiding past behaviors that generated pain, and (5) tend to hold undiversified stock portfolios. These behaviors deleteriously affect the financial well-being of individual investors.

This evidence suggests that the balance between institutional and retail traders is a potent predictor of the degree of informational efficiency with which a given issuer's securities trade. Thus, a dominant or significant presence of retail investors will be expected to significantly lower the statistical power of ESM.

10. Beta Estimation Problems

a. Asyncronicity

A difficulty arises in connection with the estimation of beta when an issuer trades in an inefficient market. This is the problem of asyncronicity.

Beta is a measure of the volatility of an individual firm's stock price to exogenous market movements, and it is used to control for such movements over the event

[76] Keith Jacks Gamble & Wei Xu, 'Informed retail investors: Evidence from retail short sales' (2017) 40 J Emp Fin 59; Teall, '*Financial Trading,'* supra note 64. However, see also Eric K Kelley & Paul C Tetlock, 'How Wise Are Crowds? Insights From Retail Orders And Stock Returns' (2013) 3 J Fin 1229, finding that at least some segments of the retail investor population are information traders rather than noise traders. A similar result is found in Joshua D Coval, David A Hirshleifer & Tyler Shumway, 'Can Individual Investors Beat the Market?' (September 1, 2005) HBS Finance Working Paper No 04-025, Harvard NOM Working Paper No 02-45,
online: <https://ssrn.com/abstract=364000 or <http://dx.doi.org/10.2139/ssrn.364000>.
[77] Barber & Odean, 'Individual Investors,' supra note 55, vol 2B at ch 22.

window in question. Beta is calculated using historical price data – typically the 100-200 days immediately preceding the event window.[78]

Thin trading, however, can produce what is known as 'asyncronicity' which tends to result in material underestimates of beta.[79] Asyncronicity occurs when market movements are not chronologically correlated with share price responses to those movements. Suppose, for example, that on January 22 the market as a whole drops by 5%. In order to calculate the beta of ABC Corp., the market drop on January 22 will be compared to the share price change of ABC Corp. on January 22. But if ABC Corp. is a small public corporation with very thin trading, there may be no trading in the shares until, say, January 25. Simply matching contemporaneous share price and market movements yields a beta of zero – even if the trading on January 25 is in fact responsive to the market movement on January 22. Hence, asyncronicity introduces a downward bias in the calculation of beta.[80] It also results in an overestimation of the stability of beta for a given issuer.[81]

Economists have developed tools for estimating beta in the presence of thin trading.[82] However, there is evidence that these tools are routinely ignored by both academics and commercial beta estimation services.[83] Over a short event window, where there is likely to be little market movement, this may not be problematic. It may, however, be very problematic when longer event windows are used – particularly where the market as a whole is volatile.

Thin trading and asynchronicity may prejudice the calculation of damages in either direction. If there are upward market movements during the event window, then damages will tend to be understated. Suppose, for example, that ABC Corp. has a

[78] See e.g. Mackinlay, 'Event Studies,' supra note 11; Gordon J Alexander & Norman L Chervany, 'On the Estimation and Stability of Beta' (1980) 15 J Fin Econ 123.
[79] See e.g. E Dimson & PR Marsh, 'The Stability of UK Risk Measures and The Problem of Thin Trading' (1983) 38 J Fin 753 [Dimson & Marsh]; David J Fowler, C Harvey Rorke & Vijay M Jog, 'A Bias-Correcting Procedure for Beta Estimation in the Presence of Thin Trading' (1989) 12 J Fin Res 23; Roger G Ibbotson, Paul D. Kaplan & James D Peterson, 'Estimates of small-stock betas are much too low' (1997) 23 J Port Man 4; Andrew W Lo & A Craig MacKinlay, 'An Econometric Analysis of Nonsynchronous Trading' (1990) 45 J Econometrics 181; J Cohen Kalman, Gabriel A Hawawini, Steven F Maier, Robert A Schwartz & David K Whitcomb, 'Friction in the trading process and the estimation of systematic risk' (1983) 12 J Fin Econ 263; E Maynes and J Rumsey, 'Conducting event studies with thinly traded stocks' (1993) 17 J Bank & Fin 145.
[80] Myron Scholes and Joseph T Williams, 'Estimating Betas from Nonsynchronous Data' (1977) 5 J Fin Econ 309.
[81] Dimson & Marsh , supra note 79.
[82] See those studies cited supra in notes 79-80 and infra note 83.
[83] Roger G Ibbotson, Paul D Kaplan and James D Peterson, 'Estimates of small-stock betas are much too low' (1997) 23 J Port Man 4.

beta of one. Also suppose that the correction of a misrepresentation is contemporaneously associated with a 10% drop in the share price of ABC. If the market moves upwards by 3% on the same day as the corrective announcement, then the market-corrected share price actually dropped by 13%, and not 10%. If ABC is thinly traded, however, and beta is mis-estimated as 0.5, then the offsetting market movement in ABC shares will be estimated as 1.5%, leading to damages of 11.5%, rather than the correct measure of 13%.

Conversely, if there is a downward market movement over the event window, damages will tend to be overstated, since the extent to which the price drop of ABC shares is simply a response to general market forces will be underestimated.

b. Beta Instability

As noted, when employing the market model as the basis for ESM, correct estimation of the beta coefficient requires that beta be stable over time. If it is not, there is a risk that the beta employed over the event window will be inaccurate.

If the market in question is informationally efficient, the event window will be extremely short and the impact of an inaccurate beta will be small. If the market is informationally inefficient, however, as it is with smaller firms, a longer window will be employed, and an inaccurate beta may be more consequential.

Using conventional beta estimation tools for thinly traded firms can lead to mis-estimates of beta and understatement of beta instability.[84] While this can be controlled for,[85] it requires attention to statistical methodology on the part of the tester. For the purpose of event studies, however, the beta estimation window is contiguous to and immediately preceding the event window. This reduces the likelihood of beta drift over the estimation period or between the estimation period and the event window.

11. Long Event Windows and Reduction in Statistical Power

As noted in Part B.3.b, long event windows reduce the statistical power of the test, leading to a greater likelihood of a type II error (failing to reject the null hypothesis, when the null hypothesis is in fact false). Because there is a trade-off

[84] Dimson & Marsh, supra note 79. See also Douglas V DeJong & Daniel W Collins, 'Explanations for the Instability of Equity Beta: Risk-Free Rate Changes and Leverage Effects' (1985) 20 J Fin and Quan Analysis 73.
[85] See those studies cited in notes 86-91.

between the likelihood of a type I and a type II error, one way of dealing with low statistical power is to expand the level of significance from 5% to 10%. While this increases the risk of a type I error, this altered level of significance is still arguably consistent with the burden of proof in a civil proceeding – the balance of probabilities.[86]

12. Which Index Should be Used to Proxy the Market?

In order to control for market movements over the event window, ESM depends on a suitable proxy for 'the market'. This is not as straightforward as it might initially appear. The empirical literature demonstrates a reasonably robust relationship between firm size and performance over any given interval of time.[87] That suggests that when conducting an event study, it is best to match the target firm with an index that reflects other publicly traded firms of a similar size (if not other performance-linked factors such as leverage,[88] book-to-market value of equity,[89] earnings-to-price ratio,[90] and stock price momentum).[91]

In Canada, there are a variety of indices that reflect the performance of firms of different sizes. There are approximately 50 S&P/TSX market indices,[92] the largest of which is the S&P/TSX Composite Index ['TSX Composite'], which consists of 230 of the largest of the exchange's 1501 listed firms. All of the remaining indices

[86] The use of this level of significance, however, is contraindicated in criminal prosecutions, where the burden of proof is guilt beyond a reasonable doubt.

[87] The so-called 'small firm effect' - the tendency of smaller firms to yield superior returns on a risk-adjusted basis - was first noted by Banz in 1981; RW Banz, 'The relationship between return and market value of common stocks' (1981) 9 J Fin Econ 3. Whether it actually represents a departure from informational efficiency or is merely a statistical artifact of an underspecified asset pricing model is still a subject of debate; Mathijs A van Dijk, 'Is size dead? A review of the size effect in equity returns' (2011) 35 J Bank & Fin 3263 [van Dijk, 'Is Size Dead?']; Anton Astakhov, Tomas Havranek & Jiri Novak, 'Firm Size and Stock Returns: A Quantitative Survey' (2019) 33 J Econ Sur 1463; N. Jegadeesh, 'Does Market Risk Really Explain the Size Effect?' (1992) 27 J Fin & Quan Anal 337. Moreover, it is not stable over time and has generally diminished since the 1980s; JL Horowitz, T Loughran & NE Savin, 'The Disappearing Size Effect' (2000) 54 Res in Econ 83; van Dijk, 'Is Size Dead?.'

[88] LC Bhandari, 'Debt/Equity Ratio and Expected Common Stock Returns: Empirical Evidence' (1988) J Fin 507.

[89] EF Fama and KR French, 'The Cross-Section of Expected Stock Returns' (1992), 47 J Fin 427; EF Fama and KR French, 'Dissecting Anomalies' (2008) J Fin 1653.

[90] S Basu, 'The relationship between earnings' yield, market value and return for NYSE common stocks : further evidence' (1983) J Fin Econ 129; MR Reinganum, 'Misspecification of capital asset pricing: empirical anomalies based on earnings' yields and market values' (1981) 9 J Fin Econ 19.

[91] See Part G.3.b.

[92] S&P Dow Jones Indices, 'S&P/TSX Canadian Indices Methodology' online: <https://www.horizonsetfs.com/horizons/media/pdfs/indiceseducation/S-PTSX-Canadian-Indices-Methodology.pdf>.

(except for the S&P/TSX SmallCap Index ['TSX SmallCap'] are partitions of the TSX Composite based on size and industrial classification.[93]

The S&P/TSX Venture Composite Index consists of all shares traded on the TSXV that are at last 0.05% of the aggregate value of the Index,[94] while the TSX SmallCap Index consists of firms having a market cap of at least C$100 million and not more than C$1.5 billion.[95] The CSE Composite Index consists of all CSE-listed issuers with a market capitalization of at least C$5 million.[96]

In the United States, there are far more choices of index. The S&P maintains several hundred indices for U.S. securities stratified by type of security, asset class, industrial sector, geography, investment style (e.g. value securities versus growth securities), and other factors.[97] The most widely reported of these indices is the S&P 500, which consists of all U.S. public companies with a market cap in excess of US$8.2 billion.[98] This index is thus only appropriate for event studies conducted on the very largest public companies. The Russell 3000 Index, by contrast, is a capitalization-weighted index that includes about 98% of all publicly traded corporations in the U.S.[99]; it is thus a much better gauge of overall market performance. The Center for Research in Security Prices ['CRSP'] maintains separate indices for all of the securities listed (respectively) on the NYSE, NYSE American, NASDAQ, and ARCA markets.[100] It also maintains a number of combined indices, the broadest of which includes all the securities listed on NYSE, NYSE American, Nasdaq, and ARCA.[101] Aside from the Russell 3000, this later index is the best approximation to the U.S. market as a whole.

Overall, for U.S. firms, it is thus possible to find an index that reflects the subject firm at a greater level of granularity, including not only size, but other attributes such as industry and investment style.

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[93] Ibid.
[94] S&P Indices, 'S&P/TSX Venture Composite Index Methodology' online: <https://www.tsx.com/resource/en/63>.
[95] S&P Dow Jones Indices, 'S&P/TSX Canadian Indices Methodology' online: <https://www.horizonsetfs.com/horizons/media/pdfs/indiceseducation/S-PTSX-Canadian-Indices-Methodology.pdf>.
[96] Canadian Securities Exchange, 'The CSE Composite Index Methodology' online: <https://webfiles.thecse.com/cse_composite_index_methodology.pdf>.
[97] S&P Dow Jones Indices, 'Find an Index' online: <https://us.spindices.com/index-finder/>.
[98] S&P Dow Jones Indices, 'S&P 500 (MXN)' online: < https://us.spindices.com/indices/equity/sp-500>.
[99] FTSE Russell, 'Indexes' online: <https://www.ftserussell.com/>.
[100] ' CRSP' supra note 25.
[101] Ibid.

F. Causes and Correlates of Market Efficiency

In this section, I explore a variety of factors that are either correlated with market efficiency or which contribute to market efficiency.

1. Proportion of Informed Versus Noise Traders

As the discussion in Part E has highlighted, the proportion of informed traders versus noise traders is one of the most important factors contributing to trading efficiency. As noted, institutional traders are generally thought to make up the bulk of informed traders, while retail traders are generally thought to make up the bulk of noise traders. Thus, the greater the proportion of institutional traders, the more likely it will be that the security in question trades in an efficient market.

2. The Listing Market

There are many different listing platforms that a public firm may list on, such as the Toronto Stock Exchange, the Toronto Venture Exchange, the Canadian Securities Exchange, the NYSE, Nasdaq, and so on. As a general matter, there is a reasonably robust correlation between listing platform and informational efficiency.[102] This a function of the fact that different platforms differ across a wide spectrum of factors. One of the most important is listing criteria. Only relatively large firms, for example, may list on senior exchanges such as the TSX or the NYSE. As I have already noted, there is a strong correlation between firm size and informational efficiency; hence, it is more likely that a TSX-listed firm will trade efficiently than that a TSXV-listed firm will trade efficiently.

Other important differences include whether the listing market is organized as an auction market or a dealer market,[103] the manner in which trades are priced,[104] and

[102] See e.g. John Affleck-Graves, Shantaram P Hedge & Robert E Miller, 'Trading Mechanisms and the Components of the Bid-Ask Spread' (1994) 49 J Fin 1471; Marshall E Blume and Michael A Goldstein, 'Quotes, Order Flow, and Price Discovery' (1997) 52 J Fin 221.

[103] The NYSE, the TSX, the TSXV and the CSE are auction markets which match competing bids and offers. While at one time Nasdaq was a dealers' market in which competing market makers continuously post prices at which they are willing to buy and sell securities, it is now an auction market.

[104] Jeff Fleming, Barbara Ostdiek & Robert E Whaley, 'Trading Costs And The Relative Rates Of Price Discovery In Stock, Futures, and Option Markets' (1996) 16 J. Futures Mkts 353. Pricing schedules can differ quite dramatically. For example, some platforms employ a 'maker/taker' model in which the maker of liquidity (i.e. those who post limit orders) are paid for posting orders, while the 'active' side of the trade that is matched against a limit order pays a fee. Other platforms employ a 'taker/maker' model in which the parties that are respectively charged or compensated are reversed. See e.g. Justin Cox, Bonnie

the matrix of trading rules that govern market microstructure. All of these have an impact on price discovery and market efficiency.

Despite the correlation between trading platform and market efficiency, however, there is a high degree of variation among listed firms. Many firms that are able to meet demanding initial listing criteria will subsequently perform poorly. These may end up as thinly-traded small issuers or essentially defunct corporate shells seeking a partner with whom to effect a reverse-takeover.[105]

The listing platform is not so much an independent factor contributing to (or subtracting from) market efficiency as it is a proxy for other underlying drivers of efficiency such as size, depth of trading, proportion of institutional ownership, number of market makers, etc. Thus, as recognized by District Judge Lechner in *Cammer v. Bloom*[106], the specific listing platform is not a particularly reliable *indicium* of the efficiency with which a particular stock trades:

> For [fraud on the market theory] purposes, *each security has a distinct market.* A market in the broad sense of the place or mechanism by which securities are traded such as a stock exchange *can be open, developed or efficient for some securities listed there and not for others.*') [emphasis in original].

I agree with this assessment. The listing platform is a poor proxy for market efficiency, and the trading efficiency of a given issuer should be individually assessed using other pertinent factors.

3. Cross-Listing

A non-trivial percentage of Canadian issuers - typically very large issuers - are cross-listed on one of the senior U.S. exchanges (i.e. the NYSE, NYSE-MKT, or

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Van Ness & Robert Van Ness, 'Increasing the Tick: Examining the Impact of the Tick Size Change on Maker-Taker and Taker-Maker Market Models' (2019) 54 The Fin Rev 417.

[105] On the nature of the reverse takeover, see e.g. Davies, 'The Return of the Reverse Takeover' (May 21, 2019), online: <https://www.dwpv.com/en/Insights/Publications/2019/Return-of-Reverse-Takeover>; Osler Guide, 'Reverse Take-overs in Canada' (2011), online: <https://www.osler.com/osler/media/Osler/reports/reverse-take-overs/Reverse-Take-Overs-in-Canada.pdf>.

[106] 711 F Supp. 1264 (DNJ 1989) (quoting from Bromberg & Lowenfels, 4 *Securities Fraud and Commodities Fraud* § 8.6 (Aug 1988)).

Nasdaq).[107] There is good evidence that cross-listed firms have more effective price discovery and hence a higher degree of trading efficiency.[108]

While cross-listed firms will tend to be large firms that trade efficiently, once again there is sufficient variation to require an individualized assessment.. However, for the purpose of assessing these other factors (such as depth of trading or number of analysts) it is important to take into account data from all pertinent markets.

4. Analyst Coverage

The job of the analyst is to resolve information asymmetries by gathering firm-specific information, interpreting the economic purport of that information, and selling this information and associated trading recommendations to trading clients, both retail and institutional. In an efficient market with rational expectations, traders would not pay for this information if it did not actually generate alpha. The existence of a deep pool of investment advisors thus supplies a *prima facie* case not only that analysts create value, but that they make securities markets more efficient.

There is no shortage of empirical evidence that is consistent with the efficiency-enhancing role played by analysts. Greater analyst coverage is associated with an increase in institutional ownership, share price, and liquidity.[109] A lack of such coverage is associated with less robust informational efficiency[110] and slower adjustment of share price to new information.[111] This is particularly true for

[107] Éric Chouinard & Chris D'Souza, 'The Rationale for Cross-Border Listings' (Winter 2003-2004) Bank of Canada Review 23 (as of 2004, approximately 15% of TSX-listed firms were cross-listed, mostly on the senior exchanges noted in the text). At the time when this study was conducted, NYSE-MKT was known as the American Stock Exchange (AMEX).

[108] Chouinard and D'Souza, ibid*;* Joel Hasbrouck, 'One Security, Many Markets: Determining the Contributions to Price Discovery' (1995) 50 J Fin 1175; Richard T Baillie, G Geoffrey Booth, Yiuman Tse & Tatyana Zabotina, 'Price discovery and common factor models' (2002) 5 J Fin Mkts 309; Cheol S Eun & Sanjiv Sabherwal, 'Cross-Border Listings and Price Discovery: Evidence from U.S.-Listed Canadian Stocks' (2003) 58 J Fin 549 (the greater the proportion of trading in the U.S., the more robust the price discovery); Roberto Pascual, Bartolomé Pascual-Fuster & Francisco Climent, 'Cross-listing, price discovery and the informativeness of the trading process' (2006) J Fin Mkt 144.

[109] Cem Demiroglu and Michael Ryngaert, 'The First Analyst Coverage of Neglected Stocks' (2010) 39 Fin Man 555. The authors find, however, that it is not simply the first analyst coverage *per se* that causes share prices to rise, but *positive* coverage.

[110] Bing Guo, David Pérez-Castrillo & Anna Toldrà-Simats, 'Firms' Innovation Strategy Under The Shadow Of Analyst Coverage' (2019) 131 J Fin Econ 456 [Guo et al., 'Innovation Strategy'].

[111] C Holden & A Subrahmanyam, 'Long-Lived Private Information and Imperfect Competition' (1992) 47 J Fin 247; FD Foster and S Viswanathan, 'The Effect of Public Information and Competition on Trading Volume and Price Volatility' (1993) 6 Rev Fin Stud 23; Michael J Brennan, Narasimhan

innovative firms that suffer from a high degree of information asymmetry between insiders and outsiders.[112]

Caution is indicated, however. There is abundant evidence, for example, that institutional money managers do not on average 'beat the market' (i.e. outperform a pertinent market index, or generate 'alpha').[113] Since the trading activity of these institutional traders is routinely supported by an abundance of professional analysts, the apparent inability of institutional investors to earn alpha is consistent with the view that analysts contribute little or nothing to price discovery and market efficiency.

In addition, it may be that instead of enhancing informational efficiency, analysts are attracted to firms that already trade in an informationally efficient manner. This is not an implausible hypothesis. Institutional investors generally eschew ownership of smaller firms and concentrate their holdings in large and liquid firms that are likely, for a variety of reasons (such as a high proportion of institutional investors, the presence of short selling, and an abundance of market makers) to

Jegadeesh & Bhaskaran Swaminathan, 'Investment Analysis and the Adjustment of Stock Prices to Common Information' (1993) 6 Rev Fin Stud 799.

[112] See Guo at al., 'Innovation Strategy,' supra note 110; Jeff Madura and Thanh Ngo, 'Private information leakages and informed trading returns of tech target firms' (2014) 25 J High Tech Man 36.

[113] See e.g. Burton G Malkiel, *A Random Walk Down Wall Street* (New York, NY: WW Norton & Co Inc, 2015); Jonathan Lewellen, 'Institutional investors and the limits of arbitrage' (2011) 62 J Fin Econ 102 [Lewellen, 'Institutional investors']. For a sample that spanned 1980 to 2007, Lewellen was unable to find any statistically significant evidence of institutional alpha (abnormal return). This evidence is not consistent, however, with evidence that retail investors *underperform* the market (supra Part E.9.), which could only be the case if institutional investors outperform retail investors and therefore outperform the market. Nor is it consistent with evidence that analysts provide their clients with positive abnormal returns, as analysts' clients are disproportionately institutions. See Part F.4. The finding that institutional investors realize no alpha could be a statistical artifact of the data samples employed in such studies, which often focus on large institutionally held stocks and ignore smaller retail held stocks. It could also be a consequence of the fact that small magnitude divergences in the returns of institutional investors from the market are subject to a significant probability of a type II error and escape statistical significance for that reason. See Parts B.3.b and E.10.

trade in an informationally efficient manner. Such investors own a greater share of the market than retail investors[114] and are analysts' most lucrative clients.[115]

The occurrence of reverse (or mixed) causation gives rise to an endogeneity problem known as simultaneous equations bias, and O'Brien and Bhusan uncover evidence that this is a very real problem for econometric studies examining analysts' contribution to market efficiency.[116]

Despite these problems, the balance of the evidence suggests that analysts do in fact play a useful role in ferreting out private information and causing that information to be reflected in securities prices. Freeman, for example, finds that the security prices of large firms (with significant analyst following) anticipate accounting earnings announcements earlier than the security prices of small firms lacking analyst following.[117] This is consistent with the hypothesis that analysts gather private information which is then reflected in securities prices. Piotroski and Roulstone find evidence that 'analysts gather information at both the firm and industry levels, and their industry affiliation and expertise allows them to better interpret and disseminate common information across all firms'.[118] Both Clement[119] and Jacob et al.[120] find that analyst success improves with industry-specific expertise. Park and Stice find that the recommendations of analysts with a superior track record of predicting earnings have a greater impact on security

[114] Marshall E Blume & Donald B Keim, 'Trends in Institutional Stock Ownership and Some Implications' (March 12, 2008) unpublished paper, at 30, online: <https://pdfs.semanticscholar.org/db39/ed6d3d54fd9d4a0e9b377d9bf8e15fb6264e.pdf?_ga=2.199720806.959685576.1586129307-845350075.1586129307> (70% of equity market held by institutions); Charles McGrath, '80% of equity market cap held by institutions' (April 25, 2017), Pensions and Investments, online: <https://www.pionline.com/article/20170425/INTERACTIVE/170429926/80-of-equity-market-cap-held-by-institutions> [80% of equity market held by institutions]; Sifma, 'Who Owns Stocks in America? Individual Investors' (October 10, 2019), online: <https://www.sifma.org/resources/research/who-owns-stocks-in-america/> (62.4% of equity market held by institutions).

[115] Patricia C O'Brien & Ravi Bhusan, 'Analyst Following and Institutional Ownership' (1990) 28 J of Acct Res 55.

[116] Ravi Bhusan, 'Firm Characteristics and Analyst Following' (1989) 11 J Acct & Econ 255.

[117] Robert N Freeman, 'The Association Between Accounting Earnings and Security Returns for Large and Small Firms' (1987) J Acct & Fin 195.

[118] Joseph D Piotroski & Barren T Roulstone, 'The Influence of Analysts, Institutional Investors, and Insiders on the Incorporation of Market, Industry, and Firm-Specific Information into Stock Price' (2004) 79 The Accounting Rev 1119 at 1147.

[119] M Clement, 'Analyst forecast accuracy: Do ability, resources and portfolio complexity matter?' (1999) 27 J of Accounting and Econ 285.

[120] J Jacob, T Lys & M Neale, 'Expertise in forecasting performance of security analysts' (1999) 28 J of Accounting and Econ 51.

prices than other analysts.[121] Hong et al. find that the momentum effect (discussed below), which is a violation of both semi-strong form and weak form efficiency, is tempered by the presence of analysts (and particularly so for the smallest firms).[122] This evidence is consistent with the view that analysts speed the impoundment of new information into security prices. For the purposes of this article, perhaps the most important conclusion to be drawn is that the absence of analyst coverage in smaller firms is an *indicium* of market inefficiency.

5. Depth of Trading, Bid/Ask Spread, and the Number of Market Makers

The public securities market effectively digests the opinions of all traders as to the true or intrinsic worth of a particular issuer. The fewer the trades, the less is the amount of information that is brought into the market, and the less robust is the price discovery mechanism.[123] More specifically, illiquidity reduces the ability of knowledgeable traders to bring information into the market by exploiting arbitrage opportunities.[124] Thus, even if a particular issuer has a significant number of informed traders, illiquidity will slow the speed with which new information is impounded in security price. For this reason, thin trading can be expected to be a good predictor of the absence of semi-strong form efficiency.

Not surprisingly, there is evidence that this is the case. Robinson and Bangwayo-Skeete,[125] for example, examine the share price reaction of stocks listed on 6 Caribbean stock exchanges characterized by thin trading. They find that, in the main, major events such as parliamentary elections, natural disasters, and sovereign credit rating reviews did not impact share prices. Only in a small number of cases was an impact found, and then only with a delay of approximately 5 trading days.

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[121] Chul W Park & Earl K Stice, 'Analyst Forecasting Ability and the Stock Price Reaction to Forecast Revisions' (2000) 5 Rev of Acct Stud 259.

[122] Harrison Hong, Terence Lim & Jeremy C Stein, 'Bad News Travels Slowly: Size, Analyst Coverage, and the Profitability of Momentum Strategies' (2000) 55 J Fin 265 [Hong et al.]. The smallest firms in the sample were in the 20^{th} – 40^{th} percentile of NYSE firms by size.

[123] See generally Maureen O'Hara, 'Presidential Address: Liquidity and Price Discovery' (2003) J Fin 1335; Larry Harris, *Trading and Exchanges: Market Microstructure for Practitioners* (New York, NY: Oxford University Press, 2003)[Harris] Part 2.

[124] Robert H Battalio & Richard R Mendenhall, 'Earnings expectations, investor trade size, and anomalous returns around earnings announcements' (2005) 77 J Fin Econ 289.

[125] C Justin Robinson & Prosper Bangwayo-Skeete, 'Semi-strong Form Market Efficiency in Stock Markets with Low Levels of Trading Activity: Evidence from Stock Price Reaction to Major National and International Events' (2017) 18 Global Bus Rev 1447.

Thin trading and a wide bid/ask spread go hand-in-hand. Where there is a market maker for a particular issuer, the bid/ask spread is the difference between the prices at which the market maker will purchase and sell that issuer. In an auction market in which various bid and ask orders are matched electronically and there are no market makers, the bid/ask spread is the difference between the best bid and the best offer at any given time.[126] The bid/ask spread is commonly said to have three components; order processing costs, inventory holding costs, and adverse selection costs.[127] These are all likely to be higher in the case of thinly traded stocks. The bid/ask spread is also a function of the degree of market-making competition,[128] which will almost certainly be lower for thinly traded stocks.

The first component – order processing costs – is essentially a measure of the dealer's overhead attributable to engaging in market making.[129] If the dealer engages in making a market for multiple stocks, the cost is amortized over total trading costs for all securities.[130] Since order processing costs are relatively fixed, these costs are subject to economies of scale. Thus, the ratio of order processing costs to order flow is smaller when trading volume is higher.[131] Since, by definition, thinly traded stocks have low trading volume, these stocks experience higher processing costs.[132]

Dealer inventory costs are also higher for less liquid stocks. The inventory cost has two components. First, a market-making dealer must hold stock in inventory in order to be able to honour its posted ask price. While holding this inventory, there is a risk that the market for that stock will move against the dealer.[133] Second, holding stock in inventory carries with it an opportunity cost; i.e. the funds might have been deployed in some alternative venture with a higher return.[134]

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[126] See generally Harris, supra note 123 at 297 *et seq*.
[127] John Affleck-Graves, Shantaram P Hedge & Robert E Miller, 'Trading Mechanisms and the Components of the Bid-Ask Spread' (1994) 49 J Fin 1471; Roger D Huang & Hans R Stoll, 'The Components of the Bid-Ask Spread: A General Approach' (1997) 10 Rev Fin Stud 995.
[128] Nicolas PB Bollen, Tom Smith & Robert E Whaley, 'Modeling the bid/ask spread: measuring the inventory-holding premium' (2004) 72 J Fin Econ 97 [Bollen et al., 'Modelling'] at 103.
[129] As described by Bollen et al., ibid at 99:

> Order-processing costs are those directly associated with providing the market making service and include items such as the exchange seat, floor space rent, computer costs, informational service costs, labor costs, and the opportunity cost of the market maker's time.

[130] Ibid.
[131] Ibid.
[132] There is a strong correlation between issuer size and the depth of trading. Small public firms are likely to attract small dealers to act as market makers, and such dealers will generally be far less able than their larger counterparts to amortize order processing costs over a high volume of trading.
[133] Bollen et al., 'Modelling,' supra note 128.
[134] Ibid.

Holding an inventory in a thinly traded stock is more costly. By definition, thinly traded stocks do not trade as often. Thus, when a dealer honours its bid quote and purchases stock, this creates excess inventory. It may be some time before the dealer is able to sell that stock and rebalance its inventory. This has the effect of increasing both components of the inventory cost.

Inventory costs are also higher when the volatility of the stock is greater.[135] As small thinly traded companies are relatively information-deficient, one would expect greater volatility as the marginal value of new information is greater. There is indeed evidence that small companies have a higher degree of volatility than larger firms.[136] But even if thinly traded companies do not have an intrinsically higher volatility, new information will be impounded in price more slowly and unreliably. Thus, the pattern of trading will exhibit discontinuities and thus higher apparent volatility.

Adverse selection cost is also likely to be higher for thinly traded issuers. This cost arises from the fact that there is some probability that a market maker will trade with an insider who has superior information about expected price movement, generating an opportunity loss for the dealer. Thinly traded stocks typically have a small public float (indeed, that is a reason *why* they are thinly traded). For such firms, insiders and other potentially informed traders will typically hold a high proportion of the issuer relative to the public float.[137] This

[135] See e.g. Lawrence E Harris, 'Minimum price variations, discrete bid–asks spreads, and quotation sizes' (1994) 7 Rev Fin Stud 149; S Tinic, 'The economics of liquidity services' (1972) 86 Quar J Econ 79; S Tinic & R West, 'Competition and the pricing of dealer services in the over-the-counter market' (1972) 8 J Fin & Quan Anal 1707.

[136] See e.g. Eugene F Fama and Kenneth R French, 'Volatility Lessons' (2018) 74 Fin Anal J 42; Cheol S Eun, Wei Huang & Sandy Lai, 'International Diversification with Large- and Small-Cap Stocks' (2008) 43 J Fin & Quan Anal 489, at 494-95. The evidence is not unambiguous, however; see Richard W Sias, 'Volatility and the Institutional Investor' (1996) 52 Fin Anal J 13 (finding that large firms with high institutional ownership have the greatest volatility).

[137] In many cases, small firms are closer in time to their IPOs than large firms, and post-IPO firms generally have a very significant degree of insider ownership. See e.g. Allen Michel, Jacob Oded & Israel Shaked, 'Ownership structure and performance: Evidence from the public float in IPOs' (2014) 14 J Bank & Fin 54 (for a sample of US firms, mean retained post-IPO ownership was 70.6%); Maria CA Balatbat, Stephen L Taylor & Terry S Walter, 'Corporate governance, insider ownership and operating performance of Australian initial public offerings' (2004) Acct & Fin 299, at 303 and 311 (for a sample of Australian IPOs, retained ownership averaged 50.6%, and a significant concentration of shareholdings remained after 5 years). In addition, regardless of how far a firm is from its IPO, wealth effects come into play; it takes far less wealth to own a large share of a small company than of a large company, leading to a higher probability of a concentration of shareholdings for smaller companies.

makes it more likely that in respect of any given trade, the market maker will be dealing with an insider.

Moreover, when trading is infrequent, the share price is subject to discontinuities and thus, at any given time, will tend to be less informative to outsiders. This allows insiders more opportunities to exploit their superior information in pursuit of profit. It also gives insiders greater ability to disguise their inside trades.[138] This again raises the likelihood that any given trader with whom the market maker is dealing will be trading on the basis of inside information.

The heightened expense of serving as a market maker results in comparatively few market makers serving small companies, and the comparative absence of inter-dealer competition allows market makers to widen their bid/ask spreads.

For all of these reasons, thin trading[139] and a wide bid/ask spread are consistent with an absence of efficiency in the semi-strong form.

6. Short Selling

The presence of short selling tends to improve price discovery and make a securities market more efficient.[140] There is evidence, for example, that when China lifted its ban against short selling in 2010, new information was incorporated more quickly in stock price, liquidity (as measured by bid/ask spread) increased, and volatility decreased.[141] Remarkably, the lifting of the ban also appears to be

[138] LR Glosten and PR Milgrom, 'Bid, Ask, and Transactions Prices in a Specialist Market with Heterogeneously Informed Traders' (1985) J Fin Econ 71.

[139] For the purpose of establishing the depth of trading of a given issuer, online historical stock trading data is readily available for all Canadian public companies via the listing exchange. For the Canadian Securities Exchange, see <https://www.thecse.com/en/listings>. For the Toronto Stock Exchange and the Toronto Venture Exchange, see <https://www.tsx.com/listings/listing-with-us/listed-company-directory>.

[140] W Diamond & RE Verrecchia, 'Constraints on short-selling and asset price adjustment to private information' (1987) 18 J Fin Econ 277; EM Miller, 'Risk, uncertainty, and divergence of opinion' (1977) 32 J Fin 1151; Karl B Diether, Kuan-Hui Lee & Ingrid M Werner, 'It's SHO Time! Short-Sale Price Tests and Market Quality' (2009) 64 J Fin 37; J Boulton & MV Braga-Alves, 'The Skinny on the 2008 Naked Short-Sale Restrictions' (2010) 13 J Fin Mkts 397; Boehmer Ekkehart & Juan (Julie) Wu, 'Short Selling and the Price Discovery Process' (2013) 26 The Rev Fin Stud 287.

[141] Eric C Chang, Yan Luo & Jiniuan Ren, 'Short-selling, margin-trading, and price efficiency: Evidence from the Chinese market' (2014) 48 J Bank & Fin 411; Zhisheng Li, Bingxuan Lin, Ting Zhang & Chen Chen, 'Does short selling improve stock price efficiency and liquidity? Evidence from a natural experiment in China' (2018) 24 The Eur J of Fin 1350. See also Wen Shyu Kam, C Chan & Hsin-YuLiang, 'Spillovers of price efficiency and informed trading from short sales to margin purchases in absence of uptick rule' (2017) 50 Pacific-Basin Fin J 163 (both short selling and margin buying improve price efficiency in Taiwan, but short selling has the greater effect).

associated with an improvement in forecast quality, particularly for firms with lower price efficiency and quality of disclosure.[142]

Short selling improves pricing efficiency because it provides a mechanism for informed traders to register their views as to the appropriate market price, thereby bringing more information into the market and enhancing price discovery.[143] Without these investors, securities prices are systematically overoptimistic.[144]

G. Three Proxies for Market Efficiency

As I have noted, the informational efficiency with which a given issuer's shares trade is an important datum in determining how to design a suitable event study for determining damages in connection with cases involving misrepresentation (or FTMTD). Regrettably, at an aggregative level, the informational efficiency of Canada's equity markets has been woefully under-researched. Kennedy notes the importance of informational efficiency to Canada's capital markets, but produces no research bearing on the question.[145] In like fashion, Hendry and King state, 'studies conducted both inside and outside the Bank [of Canada] suggest that informational asymmetry remains an issue in Canadian equity markets' but again provide no citations to relevant studies.[146]

In addition, there is very little systematic research bearing on such *indicia* of market efficiency such as the number of analysts following Canadian firms (both large and small), the proportion of retail investors, the extent of short selling, bid/ask spreads, and the number of market makers. Added to this – and perhaps more important for present purposes – firm-specific data concerning many of the aforementioned factors can be hard to obtain. In the absence of a full pallet of

[142] Hao Li, Zhisheng Li, Bingxuan Lin & Xiaowei Xu, 'The effect of short sale constraints on analyst forecast quality: Evidence from a natural experiment in China' (2019) 81 Econ Modelling 338.
[143] E M Miller, 'Risk, Uncertainty, and Divergence of Opinion' (1977) 32 J Fin 1151.
[144] Ibid. Paradoxically, however, in some situations, restrictions on short selling can actually increase efficiency, by increasing the proportion of informed traders engaging in short sales activity and providing for more effective impounding of private information into share price. See DW Diamond & RE Verrecchia, 'Constraints on Short-Selling and Asset Price Adjustment to Private Information' (1987) 18 J Fin Econ 18; Adam C Kolasinski, Adam Reed & Jacob R Thornock, 'Can Short Restrictions Actually Increase Informed Short Selling? (2013) 42 J Fin Mgt 155.
[145] See Sheryl Kennedy (Deputy Governor, Bank of Canada), 'Canada's Capital Markets: How Do They Measure Up?' online: <https://www.bankofcanada.ca/wp-content/uploads/2010/06/kennedy.pdf>.
[146] See Scott Hendry & Michael R King, 'The Efficiency of Canadian Capital Markets: Some Bank of Canada Research' (Ottawa: Bank of Canada, 2004), online: <https://www.bankofcanada.ca/wp-content/uploads/2010/06/hendry.pdf>.

information, however, there are at least three good proxies for market inefficiency. These are discussed below.

1. Speed of Price Adjustment to New Information

The speed of adjustment of share price to new information is probably the most visible marker of market efficiency. Any material delay in response to new information will give the researcher a rough idea of the degree of inefficiency and a first cut at a plausible range of event windows to explore for statistical significance. Such an inspection will also provide valuable information about whether rational anticipation or information leakage has caused the share price to adjust even before the public announcement (again providing useful information on plausible event windows).

2. Depth of Trading

As indicated in Parts E.9 and F.5, depth of trading is one of the most reliable indicators of market efficiency. Online historical stock trading data is readily available for all Canadian public companies via the listing exchange.[147] Hence, depth of trading can be used as a proxy for market efficiency.

3. Issuer Size

Small issuer size is highly correlated with many other factors that are themselves *indicia* of inefficiency, including a high proportion of retail investors, thin trading, wide bid/ask spreads, lack of analyst coverage, and lack of short selling. It is not thus surprising that size is itself a predictor of market efficiency.

a. Small Firms Around the World

Many small firms that trade on relatively small stock exchanges around the world have often been found to trade inefficiently. Thus, for example, Antoniou et al. found that relatively small firms listed on both the Istanbul Stock Exchange[148] and

[147] For the Canadian Securities Exchange, see https://www.thecse.com/en/listings. For the Toronto Stock Exchange and the Toronto Venture Exchange, see https://www.tsx.com/listings/listing-with-us/listed-company-directory.

[148] Antonios Antoniou, Nuray Ergul & Phil Holmes, 'Market Efficiency, Thin Trading and Non-linear Behaviour: Evidence from an Emerging Market' (2008) 3 Eur Fin Man 175.

the Athens Stock Exchange[149] exhibited weak form inefficiencies. Appiah-Kusi & Menyah found that 5 of 11 African markets surveyed were not efficient in the weak form.[150] Nor have the smaller North American exchanges been exempt from inefficient trading. A 1982 study by Lease and Lewellen, for example, found that the stocks of issuers listed on AMEX and regional US exchanges, or which traded in the over-the-counter market ('OTC'), were much more likely to exhibit departures from their equilibrium values than were NYSE stocks.[151] A further 1988 study by Brown reaches a similar result, finding that AMEX and OTC stocks took an average of one month longer than their NYSE counterparts to fully digest an announced change in depreciation method.

b. Small Firms and the Momentum Effect

Other evidence that small firms do not trade in an informationally efficient manner arises in relation to the so-called 'momentum effect'. The underpinning of the momentum effect is a correlation between past and future performance. That is, firms whose share prices have recently outperformed continue to outperform, while those that have underperformed continue to underperform.[152] As the momentum effect must be a product of the slow incorporation of new information into share price, it is a violation of both weak and semi-strong form efficiency.[153]

Of particular importance in the context of this paper, the momentum effect is much stronger in small public companies than in large.[154] While early responses in the

[149] Antonios Antoniou, Emilios C Galariotis & Spyros I Spyrou, 'Contrarian Profits and the Overreaction Hypothesis: the Case of the Athens Stock Exchange' (2005) 11 Eur Fin Man 71. The authors also found that various regulatory changes that had the effect of encouraging more trading resulted in improvements in market efficiency.

[150] Joe Appiah-Kusi & Kojo Menyah, 'Return predictability in African stock markets' (2002) 12 Rev Fin Econ 247 (5 of 11 African markets surveyed were found not to be weak form efficient). Barnes, however, found relatively few departures from weak form efficiency on the Kuala Lumpur Stock Exchange; P Barnes, 'Thin trading and stock market efficiency: the case of the Kuala Lumpur stock exchange' (1986) 3 J of Bus Fin and Acct 609.

[151] Ronald C Lease & Wilbur G Lewellen, 'Market Efficiency across Securities Exchanges' (1982) 34 J Econ & Bus 101.

[152] Empirically, the momentum effect is limited to performance in the preceding several months to 12 months, rather than the very most recent performance; Narasimhan Jegadeesh & Sheridan Titman, 'Returns to buying winners and selling losers: Implications for stock market efficiency' (2003) 48 J Fin 65 [Jegadeesh & Titman] (three to 12 months); Robert Novy-Marx, 'Is momentum really momentum?' (2012) 103 J Fin Econ 429 (seven to 12 months; Louis KC Chan, Narasimhan Jegadeesh & Josef Lakonishok, 'Momentum Strategies' (1996) 51 J Fin 1681 (six to 12 months).

[153] Jegadeesh and Titman, ibid.

[154] Hong et al. state that 'with respect to size, once one moves past the very smallest capitalization stocks (where thin market making capacity does indeed appear to be an issue) the profitability of momentum

finance literature to this anomaly are replete with hand-wringing aimed at squaring the momentum effect with market efficiency, more recent assessments have tended to accept the momentum effect for what is appears to be; a market inefficiency most closely associated with small retail-dominated firms.

c. Small Firms and Retail Investors

The strong correlation between firm size and the presence of retail traders – typically identified as noise traders - is evidenced in a study by Rubin & Smith. Starting with the largest 2000 U.S. firms by size[155], Rubin & Smith winnowed their sample down to 1350 firms with sufficient data to include in the study, representing 63.5% of the market value of all U.S. equity during the study period.[156] For their five-year sample (1999-2003), institutional ownership averaged 82.4% in the top quartile but only 23.9% in the lowest quartile.[157]

Two things are remarkable about these figures. First, there is a very strong correlation between firm size and institutional ownership. Second, outside of very large U.S. firms, there is a remarkably low degree of institutional ownership. Over the period of time covered by the study, there were approximately 7000 publicly traded firms in the U.S.[158] Each quartile of these 7000 companies represents 1750 firms. The raw Rubin & Smith data set consisted of the largest 2000 U.S. firms. Hence, 1750 of these firms would have been drawn from the largest quartile of all U.S. firms by size, and the remaining 250 from the top 15% of the second quartile. As the bottom quartile of their sample showed only 23.9% institutional ownership, it seems inevitable that firms in lower quartiles of *all* firms by size would show even lower (and perhaps much lower) institutional ownership.

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strategies declines sharply with market capitalization'; Hong et al., supra note 122. See also Robert Novy-Marx, 'Is momentum really momentum?' (2012) 103 J Fin Econ 429 at 441-442; Louis KC Chan, Narasimhan Jegadeesh & Josef Lakonishok, 'Momentum Strategies' (1996) 51 J Fin 1681.

[155] The study covered a period of five years (1999-2003 inclusive). Size was measured using asset size as of the start of the investigatory period (December 31, 1998) based on data provided by Vickers' Stock Research; Amir Rubin & Daniel R Smith, 'Institutional ownership, volatility and dividends' (2009), 33 J Bank and Fin 627 [Rubin & Smith, 'Institutional Ownership'] at 629.

[156] *Ibid* at 629.

[157] Rubin & Smith, 'Institutional Ownership,' supra note 155 at 630. I have calculated this figure using the arithmetic mean of the five sample years. Using the same procedure, the second lowest quartile averaged 51% institutional ownership, while the second highest quartile averaged 67.4%.

[158] G Craig Doidge, Andrew Karolyi & René M. Stulz, 'The U.S. listing gap' (2017) 123 J Fin Econ 464.

A study by Lewellen points in the same direction.[159] Lewellen found that aggregate institutional returns over 1980 to 2007 tracked the CRSP value-weighted index[160] almost perfectly. This led him to conclude that institutional ownership does not differ substantially from the CRSP value-weighted index. In other words, there is a very strong tendency for institutions to hold firms in direct proportion to their market capitalization.[161] If true, it means that institutions own very little of small public companies.

Gompers and Metrick found a rapid increase in the proportion of the equity market held by institutional owners between 1980 and 1996. However, most of this bounty was realized by large public companies; the effect of this 'compositional shift' was to 'increase the demand for the stock of large corporations and decrease the demand for the stock of small corporations.'[162] Decreased demand for smaller firms (coupled with marginal institutional ownership) is suggestive of thinner trading, wider bid/ask spreads, and a lower degree of market efficiency.

d. Small Firms and Analyst Coverage

Size is a good proxy not only for the balance of retail/institutional ownership, but for analyst coverage as well.[163] In 2005, Nasdaq reported: [164]

> It has long been a concern of ours that approximately 1,200 of Nasdaq's 3,200 listed companies [37.5%] and 35% of all public companies have no research coverage [and] approximately 50% of all publicly held companies have two or fewer analysts.

Hong et al. found that 82% of the NYSE/AMEX firms in the lowest 20% of firms by market capitalization had no analysts at all.[165] In the 20th to 40th percentile ranking, 41.7% of firms also had no analysts. This evidence is highly suggestive of a dearth of analyst coverage for comparatively small Canadian firms.

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[159] Lewellen, 'Institutional investors', supra note 113 at 67.
[160] Supra note 25.
[161] Lewellen, 'Institutional Investors', supra note 113 at 67.
[162] Paul A Gompers & Andrew Metrick, 'Institutional Investors and Equity Prices' (2001) Quar J of Econ 229 at 257.
[163] Rich Fortin & Greg Roth, 'Analyst Coverage of Small Cap Firms in a Period of Brokerage Firm Retrenchment' (2007) 5 J Bus & Econ Res 61; R Bhushan, 'Firm Characteristics and Analyst Following' (1989) 11 J of Acct & Econ 255.
[164] Nasdaq 2005 Press Release, online: <http://ir.Nasdaq.com/static-files/55fe6684-bf46-491f-9d67-2275241b00a2>.
[165] Hong et al., supra note 122.

e. Small Firms and Short Selling

There is also significantly less short selling in the shares of small firms. A study[166] by IRROC,[167] the SRO regulator of the Canadian investment industry, revealed that, during the study period (May 1, 2007 to September 30, 2008) 'monthly short positions amounted to approximately 16% of trading volume in TSX-listed securities [the senior Canadian exchange with the highest listing standards and greatest depth of market] as compared to just over 1% of trading volume for securities listed on TSXV and CNSX [the two junior exchanges with lower listing standards and thinner trading].'[168]

That there is little short selling in the shares of small firms is not surprising. Effecting a short sale requires that the seller borrow securities from someone else, and institutional traders are the chief source of these borrowed shares. Since institutions do not themselves trade in the shares of small companies, however, they will have no inventories on hand to lend for the purpose of facilitating short sales by others.

f. Small Firms, Thin Trading, Wide Bid/Ask Spreads, and Absence of Market Makers

As discussed in Parts E.9 and F.5, thin trading, wide bid/ask spreads, and a dearth of market makers are virtually guaranteed for most small firms, as there are far fewer shareholders and a much smaller public float (i.e. both fewer traders and fewer shares to trade).

In sum, small size is a highly effective predictor of informational inefficiency.

H. The Size of Canadian Versus U.S. Public Companies

[166] IIROC, 'Recent Trends In Trading Activity, Short Sales And Failed Trades For the period May 1, 2007 to September 30, 2008' (February 2009) [IIROC, 'Recent Trends']. See also Camillo Lento and James Kozyra, 'A Survey of Short Selling in Canada' in Greg N Gregoriou, ed, *Handbook of Short Selling* (Waltham MA: Academic Press, 2012).
[167] IIROC is the Investment Industry Regulatory Organization of Canada. It operates pursuant to recognition orders in all Canadian jurisdictions.
[168] IIROC, 'Recent Trends,' supra note 166 at 11. CDNX is now known as the Canadian Securities Exchange.

I have noted that firm size is a good proxy for market efficiency. In this section, I review some data on the relative size of Canadian versus U.S. companies. While such aggregative data does not advance the cause of any firm-specific inquiry into market efficiency, it is at least suggestive of the caution with which expert witnesses should approach event studies in Canada – and indeed the commensurate level of caution with which judges and other decision-makers should approach such an inquiry.

Table 2 digests comparative statistics for the senior U.S. exchanges and the largest Canadian exchange, the Toronto Stock Exchange (TSX). As can be seen, the average market capitalization of firms listed on the TSX is about 44% of that of firms listed on Nasdaq and just 13% of those listed on NYSE.

Table 3 further indicates the size of the average firm listed on the two junior Canadian exchanges – the Toronto Venture Exchange (TSXV) and the Canadian Securities Market (CSE). As can be seen, the average market cap of firms listed on either junior exchange is approximately three orders of magnitude less than that of the average NYSE listed company, and two orders of magnitude less than that of companies listed on Nasdaq or the TSX.

TABLE 2
SENIOR US, UK, AND CANADIAN EXCHANGES: COMPARATIVE STATISTICS

Exchange	*Total Market Capitalization (US dollars)*	*World Ranking by Total Market Capitalization*[169]	*Average Market Capitalization Per Listed Firm (US dollars)*[170]	*Number of Listings*

[169] Not all sources have identical rankings; the approximate rankings are derived from a combination of Forbes, online: <https://www.forbes.com/pictures/eddk45iglh/bombay-stock-exchange-national-stock-exchange-india/#a243d555177f>, and Statista, 'Largest stock exchange operators worldwide as of May 2019, by market capitalization of listed companies' online: <https://www.statista.com/statistics/270126/largest-stock-exchange-operators-by-market-capitalization-of-listed-companies/> [Statista, 'Largest'].

[170] In most cases, the average market cap per listed firm is calculated by dividing the total market capitalization by the number of listings. The resulting figures understate the average market cap, since the number of listings is greater than the number of listed firms, because some firms list more than one type of security. Assuming that the ratio of listings to listed firms is somewhat comparable for all

NYSE[171]	$23.21 trillion[172]	1	$8.29 billion[173]	2,800[174]
NASDAQ	$11.22 trillion[175]	2	$3.40 billion[176]	3,300[177]
London Stock Exchange[178]	$3.16 trillion[179]	8	$3.42 billion[180]	924[181]

exchanges included in the table, this will not affect the *relative* market caps of firms listed on the different exchanges.

[171] The figures are for the NYSE alone, and not other assets owned and operated by NYSE's parent, the Intercontinental Exchange.

[172] Statista, 'Largest,' supra note 169. The NYSE indicates that the aggregate market cap of the NYSE as of June 30, 2018 was $28.5 trillion, online: <https://www.nyse.com/market-cap>. However, a direct link from that website page to 'Markets' indicates that the market cap figure includes not only the NYSE, but NYSE American, NYSE Arca Equities, NYSE Chicago, and NYSE National.

[173] Statista, 'Largest,' supra note 169 (for total market capitalization); DailyFX, online: <https://www.dailyfx.com/nas-100/NASDAQ-vs-NYSE.html> [DailyFX, 'NASDAQ'] (for number of listings).

[174] It is difficult to get an accurate count of firms listed on the NYSE. The figure in the table is taken from DailyFX, 'NASDAQ' ibid, and is said to be current as of 27 Nov 2018. Visual Capitalist, online: <https://www.visualcapitalist.com/difference-nyse-nasdaq/> states that the NYSE has 2400 listings as of 10 July 2017. Business Insider, online: <https://www.businessinsider.com/heres-the-difference-between-the-nasdaq-and-nyse-2017-7> states that the NYSE has 2400 listings as of 11 July 2017.

[175] Statista, 'Largest,' supra note 169.

[176] Statista, 'Largest,' supra note 169 (re aggregate market cap); DailyFX, 'NASDAQ,' supra note 173 (re number of listings).

[177] It is difficult to get an accurate count of firms listed on NASDAQ. The figure in the table is taken from DailyFX, 'NASDAQ,' supra note 173, and is said to be current as of 27 Nov. 2018. Visual Capitalist states that NASDAQ has 3800 listings as of 10 July 2017. Visual Capitalist, online: <https://www.visualcapitalist.com/difference-nyse-nasdaq/>. Business Insider states that NASDAQ has 3800 listings as of 11 July 2017; Business Insider, online: <https://www.businessinsider.com/heres-the-difference-between-the-nasdaq-and-nyse-2017-7>.

[178] Figures are for the London Stock Exchange only, and not other holdings of the London Stock Exchange Group.

[179] London Stock Exchange, online: <https://www.londonstockexchange.com/statistics/markets/main-market/main-market.htm>.

[180] Ibid.

[181] Ibid.

Toronto Stock Exchange[182]	$2.24 trillion[183]	9	$1.49 billion[184]	1501[185]

TABLE 3
JUNIOR CANADIAN EXCHANGES: COMPARATIVE STATISTICS

Exchange	*Total Market Capitalization (US dollars)*	*Average Market Capitalization (US dollars)*	*Number of Listings*
Toronto Venture Exchange (TSXV)[186]	$45 billion[187]	$19.5 million[188]	1653[189]
Canadian Securities Exchange	$19.5 billion[190]	$34.3 million[191]	568[192]

[182] Figures are for the Toronto Stock Exchange only, and not other assets owned and operated by the TMX Group (e.g. the Montreal Exchange, which trades derivatives, and the Toronto Venture Exchange - the TSXV – which is a junior equities exchange).
[183] These figures are derived from TMX, 'Listing with Us' (February 2020), online: <https://www.tsx.com/listings/listing-with-us>. Slightly different but apparently not quite so up-to-date figures may be found in 'The MiG Report' which indicates that there are 1572 listed issuers on the TSX and 1673 listed issuers on the TSXV; TSX/TSXV, 'The MiG Report' (December 2019) at 3, online: <https://www.tsx.com/resource/en/2180>. The '2019 Guide to Listing,' which appears to date from earlier in 2019, reports 1523 listed issuers on the TSX and 1707 on the TSXV. It also reports aggregate and average market cap for the TSX of US $2.0 B and US $1.31 M, and aggregate and average market cap for the TSXV of US $34 B and US $19.6 M; TSX/TSXV, 'The 2019 Guide to Listing' (2019), online: <https://www.tsx.com/ebooks/en/2019-guide-to-listing/> [TSX/TSXV, 'Guide to Listing'].
[184] Ibid.
[185] Ibid.
[186] The TSXV is owned and operated by the TMX Group, which also owns the Toronto Stock Exchange.
[187] TSX/TSXV, 'Guide to Listing,' supra note 183.
[188] Ibid.
[189] Ibid.
[190] CSE, 'CSE Reports Record Issuer Total, Market Capitalization as Growth Continues in First Quarter of 2019' (2019), online: <https://thecse.com/en/about/publications/cse-news/cse-reports-record-issuer-total-market-capitalization-as-growth> [CSE, 'Record'].
[191] CSE, 'Record' ibid. Although no median market cap is available, there are several multi-billion dollar listings on CSE that likely render the mean significantly higher than the median. It is not known if the same is true of the TSXV.
[192] CSE, 'About the CSE' (January 31, 2020), online: <https://www.thecse.com>.

Further evidence on the comparative size of U.S. and Canadian companies comes in the form of statistics bearing on the size of the average initial public offering ('IPO') in the two countries. In a study of Canadian and U.S. IPOs, Carpentier, Kooli and Suret found that the average Canadian IPO was CAN $17 million, while the average U.S. IPO was CAN $82 million.[193]

Given the strong correlation between firm size and market efficiency, this high-level data supports the view that many Canadian firms do not trade in an informationally efficient manner.

I. Damage Calculations Under Part XXIII.1 of the OSA

Part XXIII.1 of the Ontario *Securities Act* ('OSA') creates a civil liability for various types of secondary market misrepresentations and non-disclosures. Potential liabilities arise in respect of:

1. A misrepresentation by a responsible issuer[194] in a document;[195]
2. A misrepresentation in a public oral statement by a person with actual, implied or apparent authority to speak on behalf of a responsible issuer;[196]
3. A misrepresentation by an 'influential person' in a document or public oral statement;[197]

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[193] Cécile Carpentier, Maher Kooli & Jean-Marc Suret, 'Initial Public Offerings: Status, Flaws, and Dysfunctions' in *Small and Medium-Sized Enterprise (SME) Financing Data Initiative* (Ottawa: Gov't of Canada, 2003), online: <https://www.ic.gc.ca/eic/site/061.nsf/vwapj/PrimaryIssues_e.pdf/$FILE/PrimaryIssues_e.pdf>. If capital pool companies are excluded from the sample, the Canadian average jumps to CAN $31 million.

[194] The misrepresentation may also be made by 'a person or company with actual, implied, or apparent authority to act on behalf of a responsible issuer'; OSA s 138.3(1).

[195] OSA s 138.3(1). The term 'document' is expansively defined in OSA s 138.1, and includes all documents required to be filed with the Commission, documents required to be filed by some other governmental authority or by a stock exchange or a quotation and trade reporting system, or that is 'any other communication the content of which would reasonably be expected to affect the market price or value of a security of the responsible issuer'.

[196] OSA s 138.3(2). The term 'public oral statement' is defined in OSA s 138.1 in the following manner;
> 'public oral statement' means an oral statement made in circumstances in which a reasonable person would believe that information contained in the statement will become generally disclosed.

[197] OSA s 138.3(3). The term 'influential person' is defined (in OSA s 138.1) in the following manner;
> 'influential person' means, in respect of a responsible issuer,
> (a) a control person,
> (b) a promoter,
> (c) an insider who is not a director or officer of the responsible issuer, or

4. A FTMTD in accordance with the Act.[198]

These liabilities are summarized in table 1.

The threshold question for addressing liabilities under the OSA is whether or not a particular purchaser or seller has a cause of action. For each of the four potential liabilities described above, table 1 addresses that question in columns 2-4. Column 2 indicates who suffers a loss as a result of the misrepresentation (or FTMTD), column 3 indicates who does not suffer a loss, and column 4 indicates the pertinent sections of the OSA indicating who has an entitlement to sue (which, happily, in each case corresponds to those persons indicated in column 2).

Table 4 indicates that for both misrepresentations and FTMTDs there are three classes of plaintiffs, distinguishable by when each plaintiff purchases and/or sells their securities. For convenience I have labelled these classes A, B, and C.

Table 5 indicates how damages are to be computed for each of these plaintiff classes for each type of actionable conduct.

TABLE 4
CLASSES OF PLAINTIFFS

MISREPRESENTATION OF GOOD NEWS	CLASSES A, B, C PURCHASE	CLASS A SELLS	CLASS B SELLS	CLASS C HAS NOT YET SOLD
MISREPRESENTATION OF BAD NEWS	CLASSES A, B, AND C SELL	CLASS A REPURCHASES	CLASS B REPURCHASES	CLASS C HAS NOT REPURCHASED
FTMTD OF GOOD NEWS	CLASSES A, B, AND C SELL	CLASS A REPURCHASES	CLASS B REPURCHASES	CLASS C HAS NOT REPURCHASED
FTMTD OF BAD NEWS	CLASSES A, B, AND C PURCHASE	CLASS A SELLS	CLASS B SELLS	CLASS C HAS NOT YET SOLD

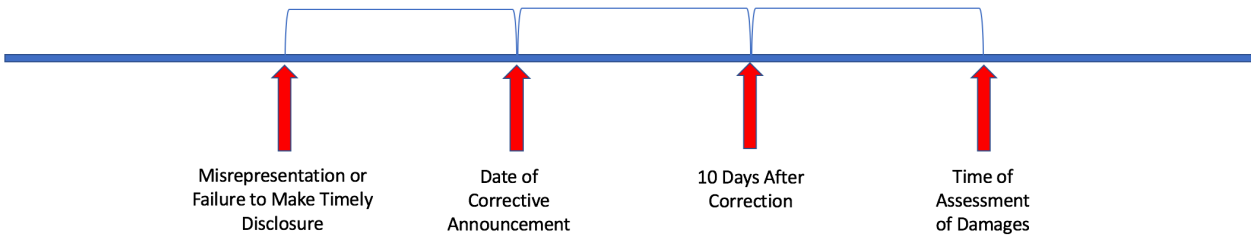

TABLE 5

(d) an investment fund manager, if the responsible issuer is an investment fund.

[198] OSA s 138.3(4). The term 'failure to make timely disclosure' is defined in OSA s 138.1 as 'a failure to disclose a material change in the manner and at the time required under this Act or the regulations'.

DAMAGE CALCULATIONS

NATURE OF WRONG	CLASS A (securities sold or repurchased, as the case may be, on or before 10 trading days after the corrective announcement)	CLASS B (securities sold or repurchased, as the case may be, after 10 trading days after the corrective announcement)	CLASS C (securities not sold or repurchased, as the case may be, at the time when damages are determined)
MR of Good News **OR** **FTMTD of Bad News**	The price paid for the securities less the price received upon sale[199]	The lesser of i) the price paid for the securities less the price received on sale, and ii) the price paid for the securities less the average price prevailing in the 10 trading day window following the corrective announcement[200]	The price paid for the securities less the average price prevailing in the 10 trading day window following the corrective announcement[201]
MR of Bad News[202] **OR** **FTMTD of Good News**	The price at which the securities were reacquired less the price at which they were initially sold[203]	The lesser of i) the price at which the securities were reacquired less the price at which they were initially sold and ii) the average price prevailing in the 10 trading days following the corrective announcement less the	The average price prevailing in the 10 trading days following the corrective announcement less the price at which the securities were initially sold[205]

[199] s 138.5(1)1.
[200] s 138.5(1)2.
[201] s 138.5(1)3.
[202] Note that where there is a misrepresentation of bad news, then (for all three classes) only those who already held the securities when the misrepresentation was made have a cause of action.
[203] s 138.5(2)1.
[205] s 138.5(2)3.

		price at which they were initially sold[204]	

J. The Shortcomings of the OSA Scheme for Measuring Damages

The OSA scheme of civil liability is likely to lead, in a majority of cases, to a material miscalculation of the damages awarded for secondary market misrepresentation or FTMTD. The OSA method for calculating damages eschews ESM in favour of a procrustean bed of mechanical rules. With a slender exception discussed below, these rules do not allow either exogenous market movements or confounding events to be taken into account. Nor do they allow for the truncation of the event window, or the adjustment of that window either backwards or forwards. Moreover, the OSA method for computing damages inappropriately employs the *average* price over the event window, rather than the CAR. Even in cases where a 10-day event window is appropriate, this will routinely result in an underestimation of the damages suffered by most plaintiffs.

The inability of the court to employ any but the prescribed method virtually guarantees a mis-estimation of damages in both efficient and inefficient markets. In respect of the former, absent complicating factors, a one or two day event window (rather than the statutory 10 days) is appropriate. By inappropriately lengthening the event window, the statutory scheme greatly raises the likelihood that exogenous market movements[206] and/or confounding events will contaminate the calculation of damages.

Moreover, the statutory scheme does not allow for events *prior* to the announcement in question to be taken into account. By precluding backwards expansion of the event window, it is impossible to take into account pre-announcement insider trading or rational market anticipation, potentially resulting in a serious underestimation of damages.[207]

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[204] s 138.5(2)2.

[206] If ESM is employed, exogenous market movements should, in theory, be washed out. However, in any statistical procedure there is a margin of error, and using an inappropriately long event window increases both the likelihood and magnitude of a statistical error.

[207] The potential magnitude of the underestimation is indicated in a study by Bris that found that, in Canada, the average pre-announcement price change in relation to merger and acquisition transactions was an astonishing 35.18%; Bris, 'Insider Trading,' supra note 27.

In the case of an inefficient market, the statutory scheme is no less flawed. As I have noted, in an inefficient market the length of the event window must be tailored to the individual issuer. It may be shorter or longer than the mandated 10 days in the statute, and will only adventitiously be 10 days. Even if it is 10 days, however, the statute incorrectly employs the average, rather than the cumulative change in price.

The only exception to the rigidly prescriptive character of the statutory scheme is a provision stating that[208]

> [d]espite subsections (1) and (2) [prescribing the damages calculation], assessed damages shall not include any amount that the defendant proves is attributable to a change in the market price of securities that is unrelated to the misrepresentation or the failure to make timely disclosure.

This evidential privilege, however, is extended only to the defendant, even though exogenous market movements or confounding events may just as easily prejudice the plaintiff as the defendant. In addition, this provision does not clearly allow the defendant to argue for a change in the underlying strategy for measuring damages (e.g. by arguing that an alternative event window would be appropriate). Rather, it would only appear to allow the defendant the limited freedom of proving that some portion of the damages computed in accordance with the statutory formula was not the result of the misrepresentation or FTMTD.

The statutory scheme is also faulty in inflexibly measuring damages as the difference between the price at which the plaintiff purchased (or sold) securities, and the price at which the plaintiff sold (or repurchased) those securities. As indicated above, this is the correct approach in an inefficient market. However, it is not appropriate in an efficient market. In that case, the damages of all plaintiffs are the same and independent of the price at which any individual plaintiff purchased or sold their securities.

K. Summary

The computation of damages for secondary market misrepresentations and FTMTDs should be effected by use of ESM. To this end, expert witnesses should

[208] OSA s 138.5(3).

be given wide latitude in choosing a defensible application of ESM based on such factors as:

- The need to move the event window forwards in order to accommodate inefficient trading and the consequent slow adjustment of security price to new information
- the need to move the event window backwards in order to take into account the effect on price of pre-announcement insider trading or rational market anticipation
- the presence of confounding events
- suitable adjustments to the computation of the issuer's beta in view of thin trading and/or confounding events in the beta estimation window
- the occurrence of multiple additive (or subtractive) misrepresentations, FTMTDs and/or corrective announcements
- disjunction between the liability event and the corrective announcement
- market overreaction

While a variety of factors add to or subtract from the efficiency with which an individual issuer's securities trade, the speed of adjustment of security price to new information is the most important datum in choosing an appropriate event window. Depth of trading and issuer size are also useful proxies in assessing market efficiency.

Regrettably, the statutory scheme found in most of the Canadian provinces is not ESM-based, nor is it responsive to any of the above factors. Rather, the civil liability provisions employ mechanical rules that can be expected to routinely overestimate or underestimate damages. These statutes should be modified along the lines suggested in this article.

Issuers that are guilty of a misrepresentation or FTMTD have a potent incentive to bundle good information with a corrective disclosure in order to reduce damages payable. In order to prevent such opportunistically bundled disclosures, the law should make it clear that any corrective announcement must be a clean announcement unaccompanied by any other information. Meaningful penalties should attach to each officer or director who participated or acquiesced in any bundled disclosure in violation of this proscription.